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ACCUMULATION OF SOME ARENAVIRUSES IN TRANSFERABLE VERO AND BHK-21 CELLS

Moscow VOPROSY VIRUSOLOGII in Russian No 2, Mar-Apr 81 pp 164-167

[Article by I. S. Lukashevich, R. F. Mar'yankova, A. S. Petkevich, F. M. Fidarov, N. N. Lemeshko and V. I. Votyakov, Belorussian Scientific Research Institute of Epidemiology and Microbiology, Belorussian Ministry of Health, Minsk, submitted 31 [sic] Apr 80]

[Text] Most information about the structure and reproduction of arenaviruses was obtained chiefly from studies of nonpathogenic representatives of this family [1]. In the literature available to us, there are no data describing the dynamics of accumulation of pathogenic arenaviruses (for example, Lassa fever virus) in transferable cell lines. There is only a report to the effect that special methodological procedures were used to culture infected cells for accumulation of Junin virus in BNK-21 [baby hamster kidney] cells in amounts sufficient for biochemical analysis [2].

In this work, we studied the effects of conditions of culturing infected cells and multiplicity of infection on accumulation of Lassa fever and Machupo viruses in Vero and BHK-21 cells, as well as dynamics of accumulation of activity of Machupo and Pichinde viruses under conditions of one-cycle reproduction. The obtained results provided the prerequisites for biochemical studies of purified preparations of the arenaviruses in question and determination of processes of their reproduction in infected cells.

Material and Methods

We used Lassa fever virus (Sierra Leone strain), Machupo virus (Corvallo and No 208 strains) and Pichinde virus (strain AN 3739 provided by Prof Pfau, United States). The viruses were obtained through the Virus Museum of the Institute of Virology imeni D. I. Ivanovskiy, USSR Academy of Medical Sciences. We used a 10% suspension of mouse brain infected with Machupo or Lassa fever virus, as well as culture fluid of cells infected with Machupo, Lassa and Pichinde viruses as the initial virus-containing material. Viral titers constituted 10^5 - 10^7 PPU [plaque-producing units]/ml. Pichinde virus was first cloned three times from plaque to plaque on Vero cells.

We determined infectious activity of viruses by the method of plaque titration under an agar cover in a monolayer of Vero cells cultivated at the bottom of scintillation vials.

We used both the original method of Porterfield and Allison [3] and our modified variant of this method. In the latter case, 0.1% neutral red (1:1000) was added directly to the agar cover 3 days after infection. In this version, the plaques appeared sooner (on the day after addition of dye) and were more distinct than with the original method. We used Vero and BHK-21 cells received from the Laboratory of Cell Cultures, Institute of Virology imeni D. I. Ivanovskiy, USSR Academy of Medical Sciences, to cultivate the viruses. The cells were cultured in the form of a stationary monolayer culture in vials No 120 (Flow Lab) on MEM medium (Gibco) containing 10 mM HEPES (Microbiol. Ass.), 0.075% soda, 10% calf embryonic serum (Belorussian Scientific Research Institute of Epidemiology and Microbiology) and gentamicin (200 µg/ml). To culture cells in rollers (New Brunswick), we used the same medium with a double concentration of amino acids (Microbiol. Ass.) and 0.15% soda. The maintenance medium contained the same ingredients, but concentration of serum heated to 56°C for 30 min was reduced to 2%.

The formed monolayer of cells was infected with viral dilutions and incubated for 1.5 h at 37°C. The unadsorbed virus was washed off the cells and we added maintenance medium. The maintenance medium was changed daily, or else we removed aliquots of culture fluid, depending on experimental conditions.

To produce one cycle of viral reproduction, the cells were infected with a multiplicity of 2 PPU/cell or more. At certain intervals, samples of culture fluid and infected cells were frozen at -20°C for subsequent titration. We obtained virus associated with cells (cellular virus) by means of three-fold freezing and thawing, followed by removal of cell fragments by ultracentrifugation.

Results

Effect of cell culturing method on accumulation of arenaviruses: Machupo virus reproduced in Vero and BHK-21 cells without signs of cytopathic action (CP). When the virus was cultured in stationary monolayer cultures of Vero and BHK-21 cells, maximum viral titers (10^5 PPU/ml) were demonstrable by the 5th-6th day of infection (Figure 1). Viral titer increased with daily change of maintenance medium and viral yield from infected cells was demonstrable 1 day sooner (Figure 1a).

Lassa fever virus reproduced in Vero cells with manifestation of CP on the 5th-6th day after infecting the cells with rather low multiplicity. When cultured in a stationary monolayer cultures, viral titer constituted $4.0 \cdot 10^5$ PPU/ml in Vero cells and $7.0 \cdot 10^3$ PPU/ml in BHK-21 cells. In our subsequent work with Lassa fever virus, we used only Vero cells.

Cultivation of infected cells in rollers with delay replacement of maintenance medium was found to be the most effective methodological procedure for accumulation of Machupo, Lassa and Pichinde viruses. As can be seen in Figure 1, with this method of cultivation, maximum yield of infectious virus was obtained on the 3d post-infection day. The titers of Machupo (Corvallo) and Lassa virus constituted $1.0 \cdot 10^6$ and $2.0 \cdot 10^6$ PPU/ml, respectively, while those of Machupo (No 208) and Pichinde (not shown) constituted $1.0 \cdot 10^7$ and $2.0 \cdot 10^7$ PPU/ml, respectively.

Effect of multiplicity of infection on accumulation of arenaviruses: In the first tests with Lassa virus, we determined the viral titer in the culture medium and cells on the 6th postinfection day as a function of dilution of initial 10% brain suspension.

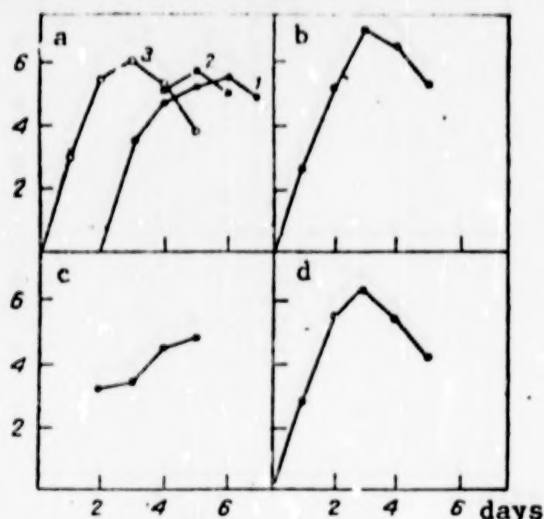


Figure 1.

Dynamics of accumulation of Machupo and Lassa fever viruses in Vero and BHK-21 cells as a function of conditions of cultivation of infected cells

- a) accumulation of Machupo (Corvallo) virus in Vero cell culture medium
 - 1) stationary monolayer culture without changing medium
 - 2) stationary monolayer culture with medium changing
 - 3) roller monolayer culture with medium changing
- b) accumulation of Machupo (No 208) virus in roller culture of Vero cells with change of medium
- c) accumulation of Machupo (Corvallo) virus with stationary monolayer culturing of BHK-21 cells without changing medium
- d) accumulation of Lassa fever virus in culture fluid of roller culture of cells.

Here and in Figures 2 and 3:

X-axis, time after infection

Y-axis, viral titer (log PPU/ml)

reproducible results of titration of virus. Thus, according to the results of one titration in dilutions of 10^{-1} - 10^{-2} , there were no plaques and the monolayer of cells was intact; in a dilution of 10^{-3} there were many "confluent" plaques and it was difficult to count them; in a dilution of 10^{-4} there was a demonstrable number of plaques (30-50), and in a dilution of 10^{-5} there were 2-3 plaques.

The same findings with respect to effect of multiplicity of infection on accumulation of Machupo and Lassa viruses were made when we used culture fluid of infected cells as the initial virus-containing material.

As can be seen in the Table, with decrease in multiplicity of infection there was increase in viral titer in both the medium and the cells. On this basis, it could be assumed that there was an autointerfering factor in the original virus. To check this assumption, we studied the dynamics of accumulation of Lassa virus as a function of multiplicity of infection (Figure 2a).

In cells infected with whole 10% suspension, as well as suspension in a dilution of 10^{-1} , maximum viral titers were recorded on the 3d day, after which they declined. When cells were infected with suspension in titers of 10^{-2} - 10^{-4} , maximum yield of virus was noted on the 5th day, after which it declined. In all these experiments, there was no appreciable difference between viral titers.

The data obtained, therefore, indicate that, with decreased multiplicity of infection, there is an increase in time of maximum yield of infectious virus.

Analogous studies of the dynamics of accumulation of infectious virus as a function of multiplicity of infection were conducted with Machupo virus (No 208). As can be seen in Figure 2b, when Vero cells were infected with brain suspension in a dilution of 10^{-1} the viral titer on the day after infection constituted $1.6 \cdot 10^3$ PPU/ml, and it held at this level for 5 days. At the same time, when cells were infected with suspension in a dilution of 10^{-4} we observed significant daily increment of infectious titer. The maximum viral titer on the 5th postinfection day was $2.1 \cdot 10^5$ PPU/ml. These data are indicative of significant autointerfering activity in the original viral preparation. This is also indicated by the constantly

Multiplicity of infection of Vero cells with Lassa fever virus as a function of yield of virus in the medium and cells

Dilution of virus (brain suspension)	Viral titer, PPU/ml	
	in culture medium	in cells
Whole, 10%	$2.9 \cdot 10^4$	$5.0 \cdot 10^3$
10^{-1}	$6.1 \cdot 10^4$	$2.7 \cdot 10^4$
10^{-2}	$8.8 \cdot 10^4$	Not titrated
10^{-3}	$3.3 \cdot 10^5$	$3.8 \cdot 10^5$

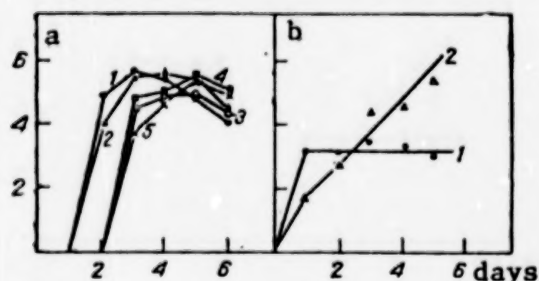


Figure 2.

Dynamics of accumulation of Lassa fever (a) and Machupo (b) viruses in culture medium of Vero cells as a function of multiplicity of infection

- a:1) infection of cells with 10% brain suspension
 2) suspension in 10^{-1} dilution
 3) 10^{-2} dilution
 4) 10^{-3}
 5) 10^{-4}
 b:1) infection with 10% brain suspension in 10^{-1} dilution
 2) 10^{-4} dilution

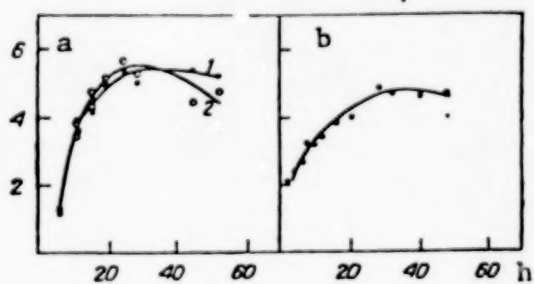


Figure 3.

Single cycle reproduction of Pichinde virus in BHK-21 cells (a) and of Machupo virus (No 208) in Vero cells (b)

- 1) virus in culture medium
 2) virus in cells

Single-cycle reproduction of Pichinde and Machupo viruses:

Figure 3 illustrates data characterizing reproduction of Pichinde virus in BHK-21 cells and Machupo virus (No 208) in Vero cells with multiplicity of more than 2 PPU/cell. After the eclipse period (6 h), maximum titer of Pichinde virus in the medium and cells was demonstrable 24-32 h after infection. Maximum yield of Machupo virus offspring was noted 32-40 h after infection

Discussion

In the case of stationary monolayer cultivation of Lassa, Machupo and Pichinde viruses on Vero and BHK-21 cells the viral titers were rather low. Unlike Machupo and Pichinde viruses, for Lassa fever virus the Vero cell lines were the most permissive, and the virus reproduced on them with a cytopathic effect. According to the data of Van der Groen [4], Lassa fever virus reproduced and manifested a CP only on Vero and Indian "mantzhak" [?] cells out of 22 cell lines of diverse origin. According to our data, in addition to Vero cells, Lassa virus also reproduced in CV-1 cells, forming plaques under an agar cover. Perhaps the transferable cells of the green marmoset are the most permissive for Lassa fever virus.

Roller cultivation of Vero and BHK-21 cells with daily change of maintenance medium was the optimum method for accumulation of Lassa, Machupo and

Pichinde arenaviruses. According to the obtained data, aside from roller cultivation, which is a more economical method of obtaining a viral harvest [5], changing the medium also increases the viral titer. Comparable data were obtained with regard to Junin virus [2]. Apparently, daily supplies of a new batch of nutrient medium have a beneficial effect on cell metabolism. Moreover, removal of some inhibitors, such as defective interfering (DI) particles undoubtedly aids in increment of infectious virus. As we know, DI particles of arenaviruses can be readily induced and accumulated in transferable Vero and BHK-21 cells [6, 7]. According to our data, there are sufficient grounds to assume, at least for Machupo virus (No 208), that with increase in multiplicity of infection the intensive accumulation of DI particles depresses reproduction of standard virus.

The study of the dynamics of accumulation of infectious virus with high multiplicity of infection (2 PPU/cell or more) is a mandatory stage of investigation of virus-specific processes and macromolecules in an infected cell, since it enables us to estimate not only the time of maturation and exit into culture medium of the bulk of viral offspring, but the tentative time of synthesis of the main pool of viral proteins and RNA.

According to our data, a maximum titer of Pichinde virus in cells and medium was demonstrated 24-32 h after infection, which corroborates the data of other authors, obtained for Pichinde and lymphocytic choriomeningitis viruses [8, 9]. For Machupo virus, the maximum yield of viral offspring was noted 32-40 h after infection. No analogous data were found in the available literature. However, it must be noted that the Machupo virus preparation used in our experiments contained DI particles.

BIBLIOGRAPHY

1. Pfau, C. J., *PROGR. MED. VIROL.*, Vol 18, 1974, pp 64-80.
2. Martinez Segovia, Z. M. et al., *ACTA PHYSIOL. LAT.-AMER.*, Vol 24, 1974, pp 656-661.
3. Porterfield, J. S. and Allison, A. C., *VIROLOGY*, Vol 10, 1960, pp 233-244.
4. Van der Groen, G., in "Ebola Virus Haemorrhagic Fever," edited by S. R. Pattyn, Elsevier, 1978, pp 255-260.
5. Golubev, D. B., Sominina, A. A. and Medvedeva, M. N., "Manual on Use of Cell Cultures in Virology." Leningrad, 1976.
6. Pfau, C. F., *MEDICINA (Buenos Aires)*, Vol 37, Suppl 3, 1977, pp 32-38.
7. Dutko, F. J. and Pfau, C. J., *J. GEN. VIROL.*, Vol 38, 1978, pp 195-208.
8. Mifune, K. et al., *PROC. SOC. EXP. BIOL. MED. (New York)*, Vol 136, 1971, pp 637-644.
9. Buchmeier, F. et al., *VIROLOGY*, Vol 89, 1978, pp 133-145.
10. Saleh, F. et al., *Ibid*, Vol 93, 1979, pp 369-376.

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DEVELOPMENT AND USE OF IMMUNOENZYMATIC METHOD FOR DIAGNOSING ARENAVIRUS INFECTIONS

Moscow VOPROSY VIRUSOLOGII in Russian No 2, Mar-Apr 81 pp 200-203

[Article by A. P. Ivanov, V. N. Bashkirtsev and Ye. A. Tkachenko, Institute of Poliomyelitis and Viral Encephalitis, USSR Academy of Medical Sciences, Moscow submitted 10 Mar 80]

[Text] Development of a highly sensitive method, which would permit speedy demonstration of virus-specific antigens in human blood, throat washings and urine soon after onset of disease, is one of the most important problems in the study of such infections as hemorrhagic fever caused by Lassa, Machupo and Junin arenaviruses, which are particularly dangerous and highly contagious. In addition, the diagnostic method must be simple to use, highly specific and rapid, from the standpoint of time of obtaining the final results. This makes it possible to institute steps with regard to early isolation of the patient as a source of infection for people around him, as well as to initiate therapy sooner.

At the present time, the indirect method of fluorescent antibodies (MFA), using cells of a transferable Vero line [1], is the main and, we imagine, only widespread method for early detection of the pathogen of particularly dangerous hemorrhagic fever.

The immunoenzymatic method (ELISA method) has gained wide use in laboratory diagnostics of various viral and bacterial infections [2]; nevertheless, until recently this method had not been elaborated for arenaviruses. Our objective here was to examine the possibility of developing and using the ELISA method for diagnosis of arenaviral infections, including hemorrhagic fever.

Material and Methods

The arenaviruses were: Machupo, strain C-80/81; Junin, strain HJ 15950; Tacaribe, strain Tr 11573; lymphocytic choriomeningitis virus, strain CA 1371; Amapari, strain An 70563, and Tamiami, strain CDCW 10777. For the safety of the personnel, Machupo and Junin viruses were used only as formalin-inactivated antigens.

The antigens of the other 4 viruses consisted of 10-20% suspensions of organ (brain, kidneys, spleen, liver) tissues from infected neonate white mice. In addition, we used blood of infected mice and culture fluid of infected cells in a transferable culture of Vero green marmoset kidneys as antigen.

Class G immunoglobulins (Ig) were isolated from guinea pig antisera (Amapari, Tacaribe, LCM [lymphocytic choriomeningitis] and Tamiami) and from immune ascites fluid (IAF) from infected white mice (Machupo and Junin) by means of gel filtration on a column with sephadex G-200 [3]. We tested the activity of the obtained IgG in the complement fixation reaction [CFT] with homologous antigen. The main phase of complement fixation occurred at a temperature of 4°C for 18 h.

Conjugation with horseradish peroxidase [Sigma, Type VI, RZ = 3.03] was performed by the method of Nakane and Kawai [4] as modified in [5].

The immunoenzymatic reaction was set up by the "double sandwich" method [5] in polystyrene Flow and Cooke panels in three variants differing in time: 3 days and 6 h. The reaction was considered positive when the ratio of extinction of experimental to control samples (P:N) constituted at least 2.1.

The "double sandwich" block of tested serum was made by our own method: after exposure with a known antigen, the panel was washed, dried and serum under study (or IAF) was added in specific dilutions. After 1-h exposure at room temperature, the unbound serum was eluted 2-3 times and conjugate was added. The serum is considered positive in the ELISA reaction when it depresses the PN index of homologous antigen by at least 50%. Normal serum (IAF) in analogous dilutions was used as a control.

We used the direct MFA on slides [1]. Homologous γ -globulin obtained from IAF of white mice and conjugated with FITTs [fluorescein isothiocyanate] was used as labeled antibodies.

Infectious activity of the preparations was determined on the basis of the viral capacity to form plaques under an agar cover in a Vero cell culture, using the conventional technique [6]. The results were evaluated on the 8th-10th post-infection day.

Results and Discussion

In developing the immunoenzymatic method for detection of arenaviruses, we set the following goals: 1) to obtain highly active and specific conjugates; 2) to develop a technique for running the reaction for demonstration of arenavirus antigens in different substrates; 3) to use ELISA for demonstration of antibodies in animal and human blood serum.

In the course of preparing IgG conjugates with peroxidase, it was established that the activity of the obtained conjugate was related to the activity of the IgG used (in these tests, this refers to complement-fixing activity). The higher the IgG titers in the CFT, the more active was the conjugate.

For example, the highest P/N for a conjugate for Junin virus, which constituted 22, was obtained with an IgG titer of 1:128 in the CFT. Use of IgG with 1:8 titer in the CFT yielded a P/N of 1.2, i.e., it was negative. To obtain a satisfactory conjugate, the minimum IgG titer in the CFT must be at least 1:32.

The choice of optimum dosage of IgG for covering and diluting the conjugate is also important to increasing sensitivity of the reaction.

Table 1. Comparative titration of Tacaribe and LCM virus antigens in the CFT and by the ELISA method

Source of antigen	Antigen			
	Tacaribe		LCM	
	ELISA	CFT	ELISA	CFT
Brain	512	8	8192	64
Liver	128	8	2048	64
Spleen	256	8	256	32
Kidneys	512	16	512	32
Blood	64	4	--	--
Culture fluid	--	--	256-512	2

Note: The reciprocals of highest dilutions of material showing positive reaction are listed.

Experiments using different virus-containing material obtained from infected neonate white mice revealed that the antigens of Tacaribe and LCM viruses gave distinct positive results with negative controls (normal antigen, normal IgG) in the ELISA reaction. Use of this method for demonstration of LCM virus antigen in culture fluid of an infected Vero cell culture also demonstrated its high efficacy. Table 1 lists the results of comparative titration of antigens of Tacaribe and LCM viruses prepared from different organs (10-20% suspension in saline) and blood of infected neonate white mice, as well as antigen in the form of culture fluid of infected Vero cells, using ELISA and the CFT.

As can be seen from the submitted data, the sensitivity of the ELISA reaction is 30-100 times greater than CFT, which is the most popular serological method. A study of the dynamics of accumulation of antigen in organs (and blood) of infected neonate white mice revealed that the immunoenzymatic method demonstrated antigens as early as the 1st-2d postinoculation day (3d-5th day with the CFT). We failed to demonstrate a difference in sensitivity between the three modifications of ELISA that we used, which differed in time of running the test (3, 1 day and 6 h). Thus, we demonstrated the possibility of obtaining an answer at the shortest time, i.e., 6 h.

Table 2. Determination of dynamics of accumulation of LCM virus and antigens

Day	LCM virus and antigen activity in Vero cells and culture fluid			
	CFT	ELISA	plaque-producing activity log PPU/ml	MFA
1	0	1:16	3.4	+
2	0	1:64	4.2	++++
3	0	1:256	6.1	+++++
4	0	1:256	6.3	+++++
5	1:2	1:512	5.1	+++++
6	1:2	1:256	5.2	+++++
7	1:2	1:256	4.2	+++++

Table 3. Titration of homologous and heterologous IAF by the "block" method

Antigen	IAF and dilutions	Antigen dilution				
		1:32	1:64	1:128	1:256	1:512
LCM	Series 3 LCM:					
	10 ⁻¹	—	—	1.5	2	3.5
	10 ⁻²	0	0	2.5	2.5	4.5
	Amapari 10 ⁻¹	0	0	12.5	10	11.5
	Machupo 10 ⁻¹	0	0	11	20	19
	Junin 10 ⁻¹	0	0	12	18	14
	Normal IAF 10 ⁻¹	0	0	14.5	13	11
Tacaribe	10 ⁻¹	2.5	1.2	1	1	—
	10 ⁻²	3.7	1.2	1	1	0
	10 ⁻³	3.7	1.7	1	1	0
	10 ⁻⁴	5	1.2	2	3.5	0
	Normal IAF 10 ⁻¹	16.3	5	5.6	3.1	0

Note: The values characterizing P/N are listed.

The culture fluid of LCM virus infected Vero cells was examined between the 1st and 7th days after infecting the culture to demonstrate antigen in the CFT, ELISA reaction, as well as for demonstration of virus by the plaque method in culture 4647. In addition, we determined the dynamics of accumulation of fluorescent antigen in Vero cells (Table 2). As in the experiments using organs of infected animals, it was demonstrated that ELISA is considerably more sensitive than the CFT in demonstrating cultural antigens as well.

We determined the possibility of using the ELISA "block" to evaluate activity of blood serum of immune animals, as well as to demonstrate antibodies in human blood serum. Table 3 lists the results of titration of antigens of Tacaribe and LCM viruses, homologous and heterologous IAF of white mice as "blocking" material. The titers of tested IAF in the RCT constituted 1:128.

Table 4. Testing of human blood serum with suspicion of LCM with the CFT, MFA and ELISA reaction

Patients' blood serum and IAF	CFT	MFA	ELISA reaction(P/N ratio)		
			serum dilution		
			10 ⁻¹	10 ⁻²	10 ⁻³
Normal IAF	0	0	29.5	29.5	29.5
LCM IAF	1:64	1:128	9	7	12
T.	0	1:4	6	15	21.4
No 55	0	0	8.6	16	19
No 34	0	0	20	26.4	28

As can be seen from the submitted data, IAF to Tacaribe virus elicited a marked depression of P/N with regard to normal ascites fluid, and in significantly higher titers (1:10,000) than in the CFT (1:128).

Only homologous IAF elicited marked depression of P/N (more than 75-80%). With the use of IAF to Amapari, Machupo and Junin viruses, no "blocking" effect was noted, which is indicative of the specificity of the ELISA method.

The blood serum of humans suspected of having LCM was tested in the CFT, ELISA reaction and MFA (Table 4).

As can be seen in Table 4, 2 samples of blood serum (T. and No 55) of those tested by the ELISA method elicited more than 50% depression of P/N level in a dilution of 10^{-1} , and the patient's blood serum was also positive when tested by the MFA.

Thus, the preliminary studies are indicative of the feasibility of using the ELISA "block" for both titration of serum of immune animals and demonstration of antibodies in serum of humans who have been victims of LCM.

BIBLIOGRAPHY

1. Casals, J., Buckley, S. M. and Cedano, R., BULL. WLD. HLTH. ORG., Vol 52, 1975, pp 421-427.
2. Voller, A., Bidwell, D. E. and Barlett, A., Ibid, Vol 53, 1976, pp 55-66.
3. Deveni, T. and Gergey, Ya., "Aminoacids, Peptides and Proteins," Moscow, 1976.
4. Nakane, P. K. and Kawai, A., J. HISTOCHEM. CYTOCHEM., Vol 22, 1974, pp 1084-1091.
5. Mathiesen, L. S., Feinstone, S. M., Wong, D. C. et al., J. CLIN. MICROBIOL., Vol 7, 1978, pp 184-193.
6. Cooper, P. D., in "Methods in Virology," New York, Vol 3, 1967.

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CSO: 1840/226

EFFECTS OF SOME PHYSICOCHEMICAL FACTORS ON ARENAVIRUSES

Moscow VOPROSY VIRUSOLOGII in Russian No 2, Mar-Apr 81 pp 240-242

[Article by N. M. Trofimov, L. M. Klimashevskaya, N. I. Yerofeyeva, A. S. Petkevich and V. I. Votyakov, Belorussian Scientific Research Institute of Epidemiology and Microbiology, Minsk, submitted 14 Jul 80]

[Text] Resistance to such environmental factors as temperature, radiant energy, various chemicals, etc., reflects the distinctions of a pathogen that must be taken into consideration in laboratory practice, epidemiology and the area of vaccines.

According to existing data [1, 2], arenaviruses are rapidly inactivated by heat, lipid solvents and changes in medium pH. However, this information was obtained chiefly for apathogenic representatives of the arenavirus group, and only limited tests were made with Machupo and Junin viruses [3-5]. There is only one report [6] in the available literature regarding Lassa fever virus, which deals with determination of sensitivity to sodium deoxycholate.

Our objective here was to examine the resistance of Lassa and Machupo viruses to heat, lipid solvents and some levels of medium pH. For the sake of comparison, we made analogous studies of Pichinde virus.

Material and Methods

Viruses: We used Lassa fever (strain Sierra Leone), Machupo (strain No 208) and Pichinde (strain AN 3739) viruses obtained from the virus collection [museum] of the Institute of Virology imeni D. I. Ivanovskiy, USSR Academy of Medical Sciences. We determined the infective activity of the viruses by the method of plaque production under an agar cover according to [7].

Cell cultures: The culture of Vero cells was obtained from the department of nutrient media and cell cultures of the Belorussian Scientific Research Institute of Epidemiology and Microbiology. Eagle's medium (MEM) with 10% calf embryo serum was used as the growth medium.

Effect of temperature: For these and subsequent studies, virus-containing culture fluid was cleared in the GA-20 rotor of a G-21 centrifuge at 3000-5000 r/min, for 30 min at 4°C. The material was decanted in test tubes, with 0.5 ml in each, and kept at 56, 37, 25 and 4°C. We determined residual infectivity in samples removed at specific intervals.

Determination of sensitivity to ether: The virus-containing culture fluid was mixed with ethyl ether in a proportion of 2:1 and incubated at 4°C for 18 h. Control samples of virus were mixed with aliquots of phosphate-sodium buffer (PSB) [8] and kept under the same conditions as the experimental ones.

Determination of sensitivity to sodium deoxycholate (SDO). SDO dilutions in an end concentration of 1:500, in PBS with 2% inactivated calf serum, were sterilized by filtration through Millipore filters. One part of the virus-containing suspension was mixed with aliquots of SDO solution. The other part (control) was put with aliquots of PSB. The mixtures were kept at room temperature for 1 h, then titrated in 10-fold dilutions.

Determination of sensitivity to some levels of medium pH: The viruses were diluted in phosphate-sodium buffer with addition of 2% inactivate calf serum in a proportion of 1:10 with end pH of the mixture ranging from 3.0-4.0 to 9.0, then incubated for 2 h at room temperature, after which the specimens were put in an ice bath (4°C) and we titrated residual infectivity.

Results and Discussion

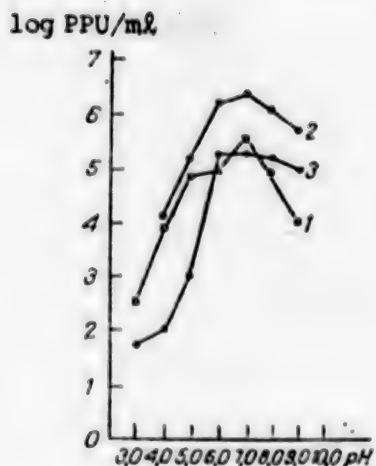
Effect of temperature factor: Table 1 shows that Lassa, Machupo and Pichinde viruses were relatively thermostable for 3 days at 4°C. There was a more intensive decline of infectious activity of Machupo virus at 25 and 37°C than Lassa and Pichinde. Heating at 56°C for 10 min had an appreciable effect on the decline of infectivity of all tested viruses. The time of complete inactivation, however, was different for the studied strains and constituted 20 min, for Lassa fever virus, 60 min for Machupo virus and 30 min for Pichinde virus. The data we obtained are consistent, to some extent, with the results of Webb and Johnson [4] who studied the effect

Table 1. Effect of temperature factor on infectivity of Lassa, Machupo and Pichinde viruses

Temp. °C	Duration	Virus titer, log PPU/ml		
		Lassa	Machupo	Pichinde
4	0 h	5.5	6.6	5.5
	24 h	5.5	6.5	5.3
	48 h	5.4	6.3	5.2
	72 h	5.4	6.3	5.0
25	0 h	5.8	6.6	5.5
	2 h	5.6	6.6	5.2
	4 h	5.3	6.5	5.0
	6 h	5.1	5.3	5.0
37	0 min	5.2	6.4	5.8
	30 "	5.0	6.3	5.6
	60 "	5.0	5.4	5.5
	120 "	4.8	5.3	5.5
	180 "	4.5	4.2	4.9
56	0 "	5.2	6.4	5.4
	2 "	3.9	—	—
	4 "	3.0	—	—
	6 "	2.6	—	—
	8 "	2.5	—	—
	10 "	1.1	3.2	3.9
	20 "	0	—	2.4
	30 "	0	2.1	0
	60 "	—	0	0

Table 2. Effects of ether and SDO on Lassa, Machupo and Pichinde viruses

Virus	Infectious activity of viruses, log PPU/ml			
	ether		SDO	
	control	exp.	contr	exp.
Lassa	6.5	0	6.3	0
Machupo	5.3	0	4.5	2.6
Pichinde	6.5	0	6.5	5.0



Effect of pH on Lassa (1), Machupo (2) and Pichinde (3) viruses [PPU--plaque producing units]

of temperature on Machupo virus. In particular, they demonstrated that Machupo virus (Corvallo strain) loses its infectivity after 4 days at 24°C and after 48 h at 37°C. When the virus was kept at 4°C, a 3 log decline of titer was observed on the 14th day. The authors demonstrated total loss of infectious activity after 30 min at 56°C. In our studies, heating at this temperature totally inactivated Machupo virus within 60 min.

Sensitivity to lipid solvents:
The results of testing the effects of ether and SDO are listed in Table 2, which shows that there was complete depression of infectivity of Lassa, Machupo and Pichinde viruses under the

influence of ether. Analogous results were obtained for Lassa fever virus under the effect of SDO. Machupo and Pichinde viruses were found to be less sensitive to this detergent than Lassa; however, the decline of their titers by 1.5-2.0 log, along with high sensitivity to ether confirms the assumption [2, 6] that there are lipids in the structure of arenaviral virions.

Effect of medium pH: As a result of our studies, it was established that Lassa fever virus, like Machupo and Pichinde, is resistant to medium pH between 6.0 and 9.0 (see Figure). A shift in the direction of acidity (below 6.0) led to rapid inactivation of the tested strains. Analogous data had been obtained previously for Machupo and Pichinde viruses [2, 6].

Thus, the data we have submitted indicate that Lassa fever, Machupo and Pichinde viruses are rather sensitive to the temperature factor, lipid solvents and a change in pH of the medium to less than 6.0. These data must be taken into consideration when studying conditions of culturing, accumulating, storing and inactivating viruses.

BIBLIOGRAPHY

1. Pfau, C. J. and Camyre, K. P., ARCH. GES. VIRUSFORSCH., Vol 20, 1967, pp 430-437.
2. Mifune, K., Carter, M. and Rawls, W., PROC. SOC. EXP. BIOL. (New York), Vol 136, 1971, pp 113-118.

3. Johnson, K. M., Wiebenda, N. H. and Mackenzie, M. L., Ibid, Vol 118, 1965, pp 113-118.
4. Webb, P. A. and Johnson, K. M., AM. J. TROP. MED. HYG., Vol 16, 1967, pp 531-536.
5. Parodi, A. S. and Coto, C. E., ARCH. GES. VIRUSFORSCH., Vol 19, 1966, pp 393-402.
6. Buckley, S. M. and Casals, J., AM. J. TROP. MED. HYG., Vol 19, 1970, pp 680-691.
7. Porterfield, J. S. and Allison, A. C., VIROLOGY, Vol 10, 1960, pp 233-244.
8. Dulbecco, R. and Vogt, M., J. EXP. MED., Vol 99, 1954, pp 167-182.

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ANTIBODY FORMATION IN COMMON VOLES DURING REPEATED INFECTION WITH THE PLAGUE
CAUSAL AGENT

Yerevan BIOLOGICHESKIY ZHURNAL ARMENII in Russian Vol 34, No 3, Mar 81
(manuscript received 10 Mar 80) pp 301-305

SUVOROVA, A. Ye., MNATSAKANYAN, A. G., VARTANYAN, A. A., SHEKHIKYAN, M. T. and
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[Abstract] Results are presented from a study on antibody synthesis in common voles caught in the Armenian SSR and subcutaneously reinfected with Yersinia pestis 2048 (10^4 microbes) on a background of a high antibody level (30 days after initial infection) and during its decline following initial infection (90 days). Antibody synthesis, evaluated by passive and indirect hemagglutination tests, proceeded more actively in reinfected voles than in those infected only once. Reinfection when the antibody level was high promoted synthesis of primarily complete antibodies, whereas reinfection when antibody levels declined promoted the synthesis of complete and incomplete antibodies. Not all animals produced antibodies upon reinfection. The number of seronegative animals among those reinforced after 30 and 90 days was $36.3 \pm 8.3\%$ and $21.8 \pm 7.2\%$, respectively. References: 10 Russian.
[220-9307]

MICROBIAL SUCCESSION IN SOIL AND THE DETERMINATION OF ECOLOGICAL STRATEGIES OF SPECIFIC POPULATIONS

Moscow MIKROBIOLOGIYA in Russian Vol 50, No 2, Mar-Apr 81
(manuscript received 29 Jul 80) pp 353-359

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[Abstract] Population dynamics of *Rhizobium leguminosarum* and *Arthrobacter crystallopoietes* in nonsterile medium-loam chernozem were studied during a succession initiated by wetting the soil and addition of glucose or cellulose. The specific population growth rate was a suitable parameter for comparing adaptation to the same habitat and for determining ecological strategy. Addition of glucose promoted the formation of a "young" system and of cellulose of a more "mature" system. The range of stabilization was broader for *Rhizobium* than for *Arthrobacter*, which indicates that the former has an r-strategy (R. M. May, 1976); the nodule bacteria were adapted to growth in the ecological vacuum existing during the initial stages of succession. *Arthrobacter* had a K-type ecological strategy (May, 1976), which aims to maintain a steady population. The most unfavorable conditions for *Arthrobacter* were introduction into soil at succession initiation and 16 days after initiation in the glucose variant. The best conditions for *Arthrobacter* occurred in the cellulose variant on the 16th day following cellulose addition. Figures 4; references 16: 13 Russian, 3 Western.
[230-9307]

EXPERIMENTAL ENCEPHALITIS OF MONKEYS INDUCED BY POWASSAN VIRUS

Moscow ZHURNAL NEVROPATOLOGII I PSIKHIATRII IMENI S. S. KORSAKOVA in Russian
Vol 81, No 2, Feb 81 (manuscript received 8 Jan 80) pp 25-33

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[Abstract] The clinical and pathomorphological characteristics of experimental infection in monkeys infected by the Primor'ye-40 strain and by the prototype Canadian LB strain of the Powassan virus are presented to evaluate the biological activity of strains of Powassan virus isolated in the Soviet Union. The experimental animals were 15 rhesus monkeys, of which 10 were infected with P-40 strain of the Powassan virus isolated in Primor'skiy Kray in 1972 from ticks of *H. longicornis*

Neuman and five of which were infected with the prototype Canadian LB strain. The pathogenicity of Powassan virus to rhesus monkeys was established with intracerebral infection and the clinical and pathomorphological characteristics of experimental Powassan encephalitis in monkeys was described. Infections with P-40 strain and the prototype strain of the Powassan virus are completely identical. The disease is manifested by crude cerebellar disorders, convulsions and unstable paralysis of the extremities. Pathomorphological changes were inflammatory-degenerative in nature and were especially noticeable in the cortex and cerebellar nucleus, the cerebral cortex and the spinal cord. Pathomorphological and electron microscope examinations indicate the marked neurotropism of Powassan virus and indicate the primary nature of neuron lesions upon experimental infection. The changes induced in the cells by these strains are similar to infections induced in the central nervous system of mice by P-40 strain of Powassan virus and An-750 strain. The large number of lymphocytes and plasmatic cells involved in perivascular infiltration indicates the development of cellular immunity in response to introduction of the virus. Figures 5; references 31: 21 Russian, 1 Czech, 9 Western.
[209-6521]

UDC 612.014.24-06:576.858.1-095.38-097.3

STABILITY OF C-BAND HETEROCHROMATIN POLYMORPHISM IN TWO HUMAN STABLE CELL LINES
DIFFERING IN THEIR SUSCEPTIBILITY TO COXSACKIE B3 VIRUS

Kiev TSITOLOGIYA I GENETIKA in Russian Vol 15, No 2, Mar-Apr 81
(manuscript received 22 Nov 79) pp 31-34

AMCHENKOVA, A. M., NAROVLYANSKY, A. N., STONOVA, N. S., GULEVICH, N. Ye. and
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[Abstract] Materials are presented that indicate the stability of C-band heterochromatin polymorphism during many cell generations occurring during long-term cultivation of intertwined lines of human cells. J-96 line produced from a leukemia patient and highly susceptible to interoviruses and J-41 subline produced from J-96 line through massive doses of coxsackie B3 virus and displaying high resistance to the coxsackie virus were analyzed. The C-band heterochromatin of the 1st, 9th and 16th pairs of chromosomes and specific marker chromosomes for each culture in intertwined cell lines display marked stability of polymorphism during long-term cultivation. Somatic crossing over a new variants of heterochromatic sections determined by the C-banding technique is seen as a rare event in tissue culture. References 18: 7 Russian, 11 Western.
[217-6521]

BRAIN CATECHOLAMINES IN RATS WITH ACUTE DIMETHOXIDICHLOROVINYL PHOSPHATE POISONING

Moscow FARMAKOLOGIYA I TOKSIKOLOGIYA in Russian Vol 44, No 3, May-Jun 81
(manuscript received 15 May 80) pp 334-338

KUTSENKO, S. A. and SAVATEYEV, N. V., Military Medical Academy imeni S. M. Kirov, Leningrad

[Abstract] The mechanisms of biological effects of organophosphorus insecticides are discussed, and they prompted this study, which involved experiments on 72 male rats given 10 mg/kg dimethoxidichlorovinyl phosphate [DDVP]; some of these rats were given intraperitoneal injections of 5 mg/kg atropine 20 min prior to DDVP. Catecholamines were demonstrated by the method of Loren et al.: perfusion for 10-15 min of the brain of hexenal anesthetized animals with 150 ml solution consisting of 2% glyoxylic acid, 1% paraformaldehyde, 25% magnesium sulfate in 0.1 M phosphate buffer (pH 7.4), after which the brain was rapidly extracted, frozen, and 30 μ m sections were cut after hot-air drying, then imbedded in polystyrene. Cholinesterase activity of the brain was determined by continuous potentiometric titration in the presence of acetylcholine as substrate. Biochemical parameters of blood serum were studied on a Technicon automatic analyzer: glucose level, sodium, potassium, chloride, creatinine levels, as well as total protein, total bilirubin, cholesterol and urea nitrogen of blood, alkaline phosphatase and transaminase activity; blood was taken from the heart of anesthetized rats, and the same animals were used to test anticholinesterase (ACE) activity in the brain. Atropinized animals presented absence of some of the DDVP-induced changes, but development of others (normalization of fluorescence of caudata and adjacent nuclei, septal nucleus, neurons of macula cerulea, but depression of fluorescence of neurons of substantia nigra, A-10 region and inferior nucleus of terminal fibers) with reference to brain catecholamines, as well as inhibition of ACE.

References 17: 5 Russian, 12 Western.

[203-10,657]

MOLECULAR MECHANISMS OF THE ACTION OF BOTULISM AND TETANUS NEUROTOXINS

Moscow USPEKHI SOVREMENNOY BIOLOGII in Russian Vol 91, No 1, Jan-Feb 81 pp 99-113

LUTSENKO, V. K., Institute of General Pathology and Pathological Physiology,
USSR Academy of Medical Sciences, Moscow

[Abstract] The structural characteristics of botulism and tetanus toxins, the specifics of their action and biochemical changes in affected tissues are discussed. The physicochemical properties of the molecules, the significance of individual amino acids to toxicity and the role of gangliosides in the chemical reception of toxins are discussed for tetanus and botulism. The binding of tetanus to nervous tissue and the effect of tetanus and botulism on the central nervous system and the peripheral synapses are outlined. The molecular mechanisms of botulism and tetanus action are outlined with respect to their effect on cholinergic processes, exchange of amino acids, oxidation phosphorylation in the mitochondria and their effect on protein synthesis, contractile protein function and transport of monovalent cations. References 114: 26 Russian, 88 Western.
[207-6521]

TRANSDUCTION IN BACILLUS THURINGIENSIS

Moscow GENETIKA in Russian Vol 17, No 4, Apr 81 (manuscript received 28 Dec 79)
pp 609-613

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[Abstract] The capability of generalized transduction of strains of *Bacillus thuringiensis* var. *galleriae* by CP-55 and Tgl8 bacteriophages was studied. Strain TC-29 with genotype thy^+ $str-r$ was used as the donor for reproduction of bacteriophage CP-55 and the recipient was strain $thy-1$. The bacteriophage Tgl8 was tested for transduction of *Bacillus thuringiensis* and the approximately identical frequency of transduction for all markers indicates generalized transduction. The special genetics of *Bacillus thuringiensis* can be developed by using ultraviolet-treated bacteriophages and enriched plating media. References 13: 7 Russian, 6 Western.
[219-6521]

ENVIRONMENT

RODENT CONFERENCE HELD IN SARATOV

Kiev VESTNIK ZOOCLOGII in Russian No 2, Mar-Apr 81 p 94

[Article by O. N. Kotlyarov]

[Text] The Fifth All-Union Rodent Conference, convened by the Central Council of the All-Union Theriological Society, was held in Saratov on 3-5 December 1980. The conference was organized by the Saratov University imeni N. G. Chernyshevskiy. One hundred-forty representatives from different institutions in the country, including from Moscow, Leningrad, and Sverdlovsk, participated in the conference proceedings. Despite the fact that the quantity of materials presented at the conference was four times that of the preceding conference (Leningrad, 1954), its subject matter was consciously limited to include taxonomy, phylogeny, morphology, intraspecific variability, population ecology, the role of rodents in ecosystems, and mutual relationships between rodents and anthropogenic factors of the environment.

A report by I. M. Gromov was devoted to the status and prospects of rodent research. This report noted the irregularity of the research effort applied to different taxonomic groups, and the ever-increasing flow of information on rodents. It emphasized the need for consolidating the efforts of taxonomists and ecologists.

V. N. Bol'shakov dwelled on the place of rodents in ecological studies in his report. He surveyed the works that had been published since the last conference. Rodents continue to be the principal target of research in ecology both in the USSR and abroad. The report examined various methods and directions of ecological research, successful development of which would be impossible without deep theoretical developments. A decline in the number of autecological studies and absence of detailed monographs on individual species were still being observed, and insufficient attention was being devoted to rare and poorly studied species.

N. I. Larina's report summarized some results of many years of work by Saratov researchers studying phenotypic variability in rodents. Ways for developing research in this direction were noted.

Studies devoted to population ecology were rather well represented at the conference. It was noted concurrently that studies examining evolution from an ecological aspect were rare. The population control problem attracted the attention of the participants. However, the appropriate methods of control have not yet been developed, though some, ecological methods for example, are presently undergoing successful development. Thus we do not yet have alternatives to chemical rodent

control. Conference materials pertaining to anthropogenic transformation of the environment and to rodents as indicators of these changes were extremely diverse. The tremendous role played by rodents in natural and artificial ecosystems is responsible for the continually growing interest toward rodents as components of various ecosystems. Thus voles are an object of a purposeful and multifaceted research effort in the study of ecosystems.

The preliminary results of the work of the Nomenclature Commission occupied a special place in the work of the conference. The participants of a discussion of the list of Russian rodent names expressed the almost unanimous opinion that the commission must continue its work on the list.

The conference participants were shown a new color film explaining the ecology of the greater gerbil, produced by the Kiev Scientific-Popular Motion Picture Studio (scientific consultant, V. S. Lobachev).

The conference proceeded efficiently, it was organized well, and its materials, containing valuable information on the present status of some problems of rodent science, were published promptly.

The next all-union rodent conference, the sixth, is to be held in Leningrad in 1983.

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CONFERENCE CONSIDERS QUANTITATIVE METHODS IN ANIMAL ECOLOGY

Kiev VESTNIK ZOOLOGII in Russian No 2, Mar-Apr 81 pp 95-96

[Article by O. A. Mikhalevich: "Third All-Union Conference 'Quantitative Methods in Animal Ecology'"]

[Text] The conference was held on 25-27 November 1980 in Leningrad (at the Zoological Institute). One hundred-twenty representatives from various scientific centers of the Soviet Union participated in it. Owing to efficient organization of the proceedings, the conference program was completed in its entirety. As the conference organizers emphasized, its principal objective was to discuss "research aimed at developing new quantitative methods, used both to collect raw data in ecology and to treat these data, and subjecting existing methods to quantitative analysis (from different points of view)."

The following directions were reflected in a published collection of theses and in the reports: 1) organization of ecological studies, 2) quantitative methods of analyzing ecological materials and discussion of individual measures, indices, and indicators, 3) mathematical simulation of ecosystems and their components, 4) quantitative methods of studying individual animal species or groups of species.

The mutual relationships between biologists and mathematicians in present practice were subjected to extensive discussion at the conference. It was recognized that the level of mathematical training afforded to biologists continues to leave something to be desired. The time has apparently come in this connection to train biological specialists on the basis of an expanded mathematical program or, on the other hand, to produce "biologically educated mathematicians". An outstanding example of creative mutual understanding demonstrated at the conference is the cooperation between Leningrad mathematicians and the parasitologist K. A. Breyev.

A significant number of papers presented at the conference (22 out of 74) were devoted to mathematical simulation of ecosystems and their components, and therefore the issue of model adequacy was quite naturally raised. Adequacy is usually defined as consistency with the real object, as being in agreement with the object (Kondakov, 1975). When we build models, we must never forget that no matter how good a model might be, it is only an approximate reflection of the object, and that it coarsens and simplifies it. Were we not to do so, serious mistakes would be unavoidable. The model and the original are not identical but similar.

Systems of concepts make up images of the world taking the form of hypotheses, theories, special sciences, and philosophies. Words and various sorts of models are the material form of these images. This is apparently why the term "model" has recently been used with increasing frequency as a substitute for the term "theory" ("hypothesis"). This trend was also reflected in the debates at the conference. However, it should be kept in mind that "mathematical models could get us into trouble when we choose to ignore the mathematics and begin interpreting the work of the biological system we are studying". Therefore it would be mandatory to "demonstrate the adequacy, of the mathematical machinery employed, to the object of investigation and to the goals pursued by such investigation" (Antamonov, 1977).

The question as to the purpose of models is directly associated with all of the above. A suggestion was made to distinguish between the following types of models: explanatory, prognostic, demonstrational, and so on. Recently, unfortunately, models of the first type have been created more and more rarely, while models of the second type have been created more and more frequently. This may be associated both with the desire to study phenomena of increasingly greater complexity and with insufficient theoretical developments of many subdivisions of biology, and of ecology in particular. Moreover prognostic models often provide answers to many practical questions, even though the possibilities for using them to make extrapolations must often be additionally substantiated.

As we can see, the conference devoted much attention to modeling problems, and therefore it was quite natural to raise the question as to the suitability of dividing the participants of future conferences into "modelers" and "statisticians". A common point of view was not reached in the course of the discussion.

Most speakers noted the higher scientific level of the reports given at the conference. On the other hand, however, it was pointed out that increasingly greater mathematical complexity and a certain degree of specialization may cause practical ecologists to lose interest in attending future conferences, thus placing the need for conducting such conferences under doubt.

Yu. A. Pesenko, the editor in chief of the collection "Kolichestvennyye metody v ekologii zhivotnykh" [Quantitative Methods in Animal Ecology] (Leningrad, USSR Academy of Sciences Zoological Institute, 1980)--he was essentially the sole organizer of the conference--made a number of valuable additions when preparing the report theses for publication; however, considerable censure was elicited by the fact that 1) the titles of some of the papers were changed not for the better, 2) the main content of some of the papers was condensed out of some of the papers, and 3) some "revisions" were not in keeping with the author's text.

It was deemed suitable to hold the next conference on quantitative methods in animal ecology 4 years hence in Leningrad.

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CRITERIA FOR EVALUATING THE STABILITY OF DEVELOPMENT IN NATURAL ANIMAL
POPULATIONS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 258, No 1, 1981
(manuscript received 8 Dec 80) pp 254-256

ZAKHAROV, V. M., Institute of Developmental Biology imeni N. K. Kol'tsov,
USSR Academy of Sciences, Moscow (presented by Academician M. S. Gilyarov,
18 Nov 80)

[Abstract] Two species of dragonflies (*Sympetrum flaveolum* L., 1758 and *S. danae* Sulzer, 1776) were studied for variability of wing venation to validate the use of three criteria for evaluating developmental stability of natural populations, in view of prior demonstration of the value of ontogenetic stability as a population feature and the increasing interest in research on the population aspect of organization of life: fluctuating asymmetry of various bilateral structures, which demonstrates random disturbances of individual development, the only criterion used heretofore, and two new ones proposed by the author—general phenotypic variance of quantitative characters and incidences, and diversity of various alternative signs; analysis of all three criteria permits indirect determination of the role of chance disturbances and genotypic factor in phenotypic variability. Ten quantitative signs referable to number of veins in different sectors of the anterior and posterior wings were used to analyze asymmetry in the dragonflies. The incidence of asymmetry was higher in both species in the groups that were hatched the earliest, suggesting a strong relationship of such disorders to development conditions. A parallel was demonstrated between changes in all three of the criteria in question. References 6: 3 Russian, 3 Western.

[200-10,657]

SPATIAL DISTRIBUTION OF FLEAS (SIPHONAPTERA) IN THE BURROWS OF THE GREAT GERBIL
IN THE SOUTH CENTRAL KARA-KUMY

Leningrad PARAZITOLOGIYA in Russian Vol 15, No 1, Jan-Feb 81 pp 31-37

STAROZHITSKAYA, G. S., ZAGNIBORODOVA, Ye. N. and KUSOVA, Z. L., All-Union Scientific
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Ashkhabad

[Abstract] Great gerbils were caught from each experimental colony and the burrows were carefully excavated in the south central Kara-Kumy to study data on the spatial distribution of fleas in the burrows of these animals. It is recommended that fleas be gathered during April-September from the mouths, passages and food chambers of burrows up to 60 centimeters deep for complete collection during excavation of the burrows. Most of the fleas gathered are in these burrows rather than on the gerbils themselves. It is recommended that collection be carried out during October and November to a depth of 1 meter in order to catch 75 to 90 per cent of the total flea population in great gerbil burrows. Excavation must be made to not less than 150 centimeters in March and December to determine the flea population. References: 21 Russian.

[213-6521]

MORTALITY AND LETHALITY RATES (DESCRIPTION AND CALCULATION DISTINCTIONS)

Moscow MEDITSINSKAYA SESTRA in Russian No 3, Mar 81 pp 32-37

[Article by V. I. Dmitriyev and A. V. Nikol'skiy (Moscow)]

[Text] There are two indicators in statistics, in the calculation of which the number of deaths is used, we refer to the lethality and mortality rates. The latter, however, are quite different in substance and calculation methods, and they must not be confused or equated. For this reason, we deemed it possible to provide a brief description thereof and of the calculation methods, knowledge about which is needed not only by physicians, but paramedical personnel, particularly those who work in offices of medical statistics and organization-methodological departments and offices of oblast, municipal and rayon hospitals.

Lethality, or mortality, is interpreted as the probability that patients suffering from some disease will die of it. One should not confuse the concepts of lethality and mortality. Unlike mortality, which refers to the ratio of deaths due to a given disease to the mean population size, lethality refers to the ratio of deaths from a given disease to number of treated cases, and it is usually expressed as a percentage.

Mortality refers to the process of population decline as a result of death. In demographic and health statistics, the term "death rate" is used to express the incidence of deaths in a specific set of people (inhabitants of the entire country, oblast, rayon, city, etc.). The base data for analysis of mortality rate are records of statistical administrations: Form No 1--information about natural population movement; Form No 4a--information about deaths under the age of 1 year according to sex, number of days and months of life, calendar month of death and birth; Form No 5d--information about the number of stillbirths and deaths of neonates 0-6 days old according to sex, causes of stillbirth and death; Form No 5--information about deaths according to sex, age and causes of death; Form No 5s--distribution of population according to age and sex; medical death certificates (forms No 246, 246v); perinatal death certifications (Form No 246ps) and annual report of therapeutic and preventive medical institutions (Form No 1).

Mortality rate is measured by means of mortality indices, which are usually intensive indices [mortality rates for given age and sex composition]. They are calculated as follows:

$$\text{annual mortality coefficient} = \frac{\text{deaths per year} \times 1000}{\text{mean population size}},$$

$$\text{mortality coefficient for several months (from estimate for year)} = \frac{\text{deaths for these months} \times 1000 \times 12}{\text{mean population size} \times \text{number of months considered}}$$

In calculating the death rate, particularly for large cities, two coefficients must be determined: the usual one and excluding nonresidents from the number of deaths. This is related to the fact that there are many therapeutic institutions in large cities, where qualified medical care is rendered not only to sick patients living in such a city, but to inhabitants of its oblast who come there for treatment. According to existing statutes, all deaths, regardless of the permanent place of residence of the victims, are recorded in the civil registry office of the place of their death; for this reason, if the deaths referable to nonresidents are not subtracted, the coefficients of mortality referable to the inhabitants of large cities would be too high.

In the last few years, there has been an increase in overall death rate; however, one cannot use only this indicator of mortality as a gauge, from comparison of which statistical conclusions are to be derived. It is known that the overall death rate is related to the age structure of the population and, when the age-related death rate is unchanged but the age structure of the population is changing, the indicators of overall mortality could change quite significantly at times, although a change therein would not be indicative of improvement or worsening of the health situation.

Methods for calculating standardized indices, which are described in special manuals on demographic and health statistics, are used to eliminate the influence of age-sex composition of the population on the overall death rate. However, it should be noted that even the standardized mortality indices do not necessarily reflect the true dynamics of processes, since they depend on the standard chosen. For this reason, to gain a more accurate idea about the existing situation one should consider the age-related death rate, which present great stability and have some common elements, regardless of mortality level, rather than overall and standardized indices. The age-related death rate, with the exception of infant mortality up to the age of 1 year, is calculated in the following manner:

$$\text{age-related mortality coefficients} = \frac{\text{deaths at given age} \times 1000}{\text{population size referable to age for which coefficient is calculated}}$$

In those cases where one cannot resort to calculation of standardized and age-related death rates, one should single out the death rates referable to infants up to 1 year of age and the population over 1 year of age from the overall mortality rate, since the different share of child population, as determined by the birth rate, has a significant influence on the overall death rate and prevents proper evaluation of the true health status of the population. The following formula is used to measure population death rate referable to those over 1 year of age:

$$\text{mortality coefficient at over 1 year of age for the year 19...} = \frac{\text{deaths at over 1 year of age} \times 1000}{\text{population size} - \text{number of births}}$$

In those cases where the birth rate, overall and infant death rates have already been calculated, one can use the following formula to determine the death rate at over 1 year of age:

$$M_1 = \frac{1000 \times M - N \times D}{1000 - N}$$

where M_1 is the mortality coefficient referable to those over 1 year old, M is the coefficient of overall mortality, N is the birth rate coefficient and D is the coefficient of infant mortality.

When considering the death rate, special significance is attributed to infant mortality up to the age of 1 year. This indicator is very important to evaluation of the health status of the population and purposeful implementation of therapeutic and preventive measures, particularly in the area of obstetrics and pediatrics. There are numerous formulas for determining the infant death rate. Sometimes it is estimated as the number of deaths of infants up to 1 year old per 1000 infants born in the same calendar year. In this case, the following formula is used:

$$\text{annual infant mortality coefficient} = \frac{\text{infant deaths in given year} \times 1000}{\text{births in given year}}$$

However, such calculations do not always yield objective data, and for this reason they can be used only when the birth rate is relatively stable. But when there is a rise or decline of birth rate, disregarding the difference in birth rate for successive years could become the source of a major mistake in calculating infant mortality, since only part of the infants who died in a given year before the age of 1 year were born in the same calendar year. For this reason, one should use the following formula for more correct calculation of the infant death rate:

$$\begin{aligned} \text{infant death rate} &= \frac{\text{infant deaths (up to 1 year of} \\ \text{(formula of Rats)} &= \frac{\text{age) in given year} \times 1000}{\frac{2}{3} \text{ live births in given year} + \frac{1}{3} \text{ live births in preceding year}} \end{aligned}$$

As we know, infant mortality in the first month of life is of particularly great importance. For this reason, it is also desirable to calculate the death rates for the 1st and next 11 months of the first year of life, in addition to the infant death rate for the entire first year of life. The calculation should be made using the following formula:

$$\text{infant death rate per calendar month} = \frac{\text{infant deaths in given calendar month} \times 1000}{\text{average monthly births in given month}}$$

The infant death rate is not the same in different periods of life. For this reason, one generally calculates the following rates:

$$\text{early neonate (1st week of life) death rate} = \frac{\text{deaths of infants 0-6 days old} \times 1000}{\text{live births}}$$

$$\text{neonate (first 28 days of life) death rate} = \frac{\text{deaths of infants 0-27 days old} \times 1000}{\text{live births}}$$

$$\text{postneonate (over 1 month old) death rate} = \frac{\text{deaths of infants over 1 month (27 days) old} \times 1000}{\text{births} - \text{infant deaths in 1st month (0-27 days)}}$$

$$\text{or} \quad \frac{(\text{infant death rate} - \text{neonate death rate}) \times 1000}{1000 - \text{neonate death rate}}$$

$$\text{perinatal death rate (stillbirths + deaths in 1st week)} = \frac{(\text{stillbirths} + \text{deaths at 0-6 days of age}) \times 1000}{\text{all registered neonates (live and still births)}}$$

The death rate in different months of infant life can be calculated on the basis of tables of infant mortality in the first year of life. This can be done using records for an oblast (Form No 4a, TsSU [Central Statistical Administration]).

The study of causes of death is a very important part of analysis of mortality. Information about causes of death makes it possible to work out and plan measures to lower morbidity and mortality; in addition, it is indicative of existing flaws in rendering medical care. To determine the death rate as it relates to different causes, one uses intensive [specific] death rates:

$$\text{death rate referable to a given cause} = \frac{\text{deaths due to a given cause} \times 1000}{\text{mean population size}}$$

For deeper analysis of the death rate, one must analyze the death rate due to a given cause separately for men and women, as well as age-related death rates due to different causes according to sex, in addition to the overall death rate attributable to this cause.

When studying population death rate, it is desirable to know the monthly fluctuations thereof, in order to make a distinction between a real rise or decline of death rate, on the one hand, and the monthly fluctuations, on the other. One uses the following formula:

$$\% \text{ deaths in given month} = \frac{\text{deaths in given month} \times 100}{\text{total deaths that year}}$$

As we have already stated, to calculate lethality one refers the number of deaths attributable to a given disease to the number of patients suffering from this disease. Determination is not made of the intensity of the phenomenon (incidence thereof in the general population--healthy and sick), but an index that characterizes the extensiveness of this phenomenon, its distribution and share of deaths among the sick.

A distinction is drawn between hospital lethality (ratio of deaths due to a given disease to number of patients treated at the hospital for this disease), extramural lethality (analogous ratio of number of deaths to sick cases treated outside a hospital) and overall lethality (overall ratio of total deaths in hospital and outside of hospital to number of cases of a given disease in and out of the hospital).

As we have already indicated, one must relate the number of deaths to total number of patients under observation to calculate lethality. If a certain number of patients were put under observation and they were all followed up until they recovered or died, one can relate the number of deaths to either the number of cases put under observation or to the number of those discharged to calculate lethality. In this case, this does not matter, since the number of discharged cases equals the number of admissions.

However, in practice, one often has to determine lethality on the basis of hospital records, which are always related to a particular period of time, most often the calendar year. And, as a rule, patients are grouped together according to time of admission and discharge, into those remaining from the prior year, those admitted in the reported year, those discharged or who have expired, and those remaining for the following year. For this reason, the method of calculating lethality from hospital records, based on relating the number of deaths to number of discharges, i.e., to the sum of deaths and discharged cases, which is used widely, is not quite accurate.

For this reason, the formula generally used to define lethality would have the following appearance:

$$\text{lethality} = \frac{\text{deaths} \times 100}{1/2 (\text{admissions} + \text{discharges})}$$

Thus, as can be seen in this formula, when calculating lethality from hospital records one should, for greater accuracy, relate the number of deaths to the arithmetic mean of numbers of admissions and discharges, rather than to the number of discharged cases.

However, in practice, there is an insignificant difference between number of admissions and discharges in a given calendar year. As a result, the lethality rate calculated by the usual method, i.e., relating number of deaths to discharges, and by the more accurate and correct method--relating number of deaths to arithmetic mean of admissions and discharges--differs very little in most cases; however, with reference to some diseases, the discrepancy may also be significant in some cases.

It should be noted that the above-described methods of calculating lethality are applicable only if there is rather rapid patient turnover in hospitals, which is usually observed in ordinary somatic hospitals. But these methods are unsuitable for hospitals in which patients spend a long time (psychiatric hospitals, tuberculosis dispensaries, oncological dispensaries, etc.). The ratio of annual interval between overall admissions and discharges and total remaining cases at the beginning and end of the year could serve to estimate the rate of patient turnover in a hospital and, consequently, to determine whether a given method of estimating lethality should be used. When the turnover is high, the first sum exceeds the second one significantly, and the greater the turnover, the greater this increment is. However, when the duration of hospital care is prolonged, the opposite is observed, i.e., the sum of cases remaining at the start of the year and at the end of the year is greater than the

sum of admissions and discharges. In this case, one should use the method of calculating lethality, which is based on determination of the number of individuals under observation for the entire period, i.e., the entire calendar year. In this case, one proceeds from the assumption of uniform distribution of patient admissions and discharges in time and that, on the average, both admitted and discharged patients are under observation for half the time. In this case, the number of patients under observation over the entire calendar year would constitute half the sum of admissions and discharges, and to this number one should also add the patients under observation at the start of the period minus the discharges:

$$\text{lethality} = \frac{\text{deaths} \times 100}{\text{number of patients at start of year} + 1/2(\text{admissions} - \text{discharges})}$$

Thus, to calculate lethality in the case of extremely slow patient turnover, one should refer the number of deaths to the sum of patients under observation as of the start of the year and to half the difference between admitted and discharged patients.

Hospital lethality serves, to a significant extent, as an indicator of quality of work of medical institutions (patient treatment and care, promptness of hospitalization, surgical care, efficacy of using therapeutic agents, etc.). However, it is complicated to estimate this parameter, since it is affected by many factors that are not directly related to quality of treatment. The lethality indicator depends on the composition of patients and, first of all, composition of patients according to diseases. For this reason, comparisons should only be made between similar departments and hospitals. It is imperative to take into consideration the influence on lethality rate of age and, occasionally, sex of patients, clinical form of disease, time of and coverage by hospitalization, and compare lethality only for patient groups that are homogeneous in all respects, and if they are of small size one should use standardized lethality rates. Lethality rates are not constants; they change as a function of improvement of diagnostic methods, promptness of treatment, change in age composition of patients, etc.

Hospital lethality rate is closely related to fullness of patient hospitalization, screening thereof for hospital care, as well as lethality in the home. For this reason, estimation of lethality indicators in a hospital should best be made concurrently with analysis of extramural lethality. For example, a low lethality in hospitals with large share of deaths in the home does not serve as grounds to judge that the quality of care is satisfactory. Rather, it reflects an unsatisfactory procedure for referring patients to a hospital, when hospitalization was refused for some categories of the seriously ill due to a shortage of beds or other reasons. In estimating the lethality rate, one must bear in mind that it does not depend only on the search for new and effective methods of treatment, but improvement of organization of extramural and hospital care.

In addition to overall hospital lethality, one also calculates the lethality rate referable to deaths occurring within the first 24 h. This parameter is calculated in order to provide greater detail and identify the composition of deaths. It is calculated in the form of incidence rate:

$$\text{less than 24-h lethality} = \frac{\text{number of deaths occurring in first 24 h} \times 100}{\text{admitted patients}}$$

as well as in the form of share of deaths occurring within the first 24 h:

$$\frac{\text{deaths occurring in first 24 h} \times 100}{\text{total hospital deaths}}$$

Not infrequently, the last indicator is called "less than 24-h lethality" in public health practice, although it only gives an idea about the distribution of deaths according to time of day. Occasionally, we observe a tendency to exclude from overall hospital lethality the cases of death within the first 24 h, i.e., under 24-h lethality, calculating the so-called reduced indicator, taking into consideration deaths occurring after the first 24 h, which should also not be done, since deaths occurring within the first 24 h are indicative of severity of disease and, consequently, the quality of organization of first and emergency care of the public.

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VACATION FACILITIES IN THE USSR

Moscow TRUD in Russian 2 Jun 81 p 2

[Article by I. Kozlov, chairman of the Central Council for Management of Trade-Union Resorts: "Summertime Resorts"]

[Text] Facts and Figures

Under the current Five-Year Plan, the network of vacation facilities for families is to be enlarged to 145,000-150,000 beds. In the future, it is planned to accept families in all rest homes [vacation facilities] and boarding houses.

More than 5 million people were housed in rest homes last year. In addition, 7 million workers and their families visited 1- and 2-day vacation homes.

This year, new sanatoriums with a total of 11,160 beds are to be started up. We refer to the Novyy Istochnik sanatorium in Vologodskaya Oblast, Krasnoyarskoye Zagor'ye, sanatoriums at the Izhminvody resort town in Tataria, rest homes in Latvia and Leningrad Oblast, and others.

It has become a custom for Soviet people to head for resorts as soon as vacation time comes, going to sanatoriums, rest [vacation] homes and boarding houses. At present, there are over 13,000 sanatoriums, rest homes, boarding houses, plant sanatorium-preventoriums, vacation centers and tourist centers in the resort zones and regions with the best climate, which are under the management of trade-unions, ministries and agencies. They can handle 2 million people at a time for treatment and rest.

The Communist Party and Soviet government have always given and continue to give enormous importance to organization--and improvement of the form-- of sanatorium and resort therapy and rest for the working people. Along with development of all sectors of the national economy, there are provisions for a broad set of social measures to create optimum working and resting conditions for Soviet people, which are spelled out in the "Main Directions of Economic and Social Development of the USSR in 1981-1985 and the Period up to 1990," which was approved by the 26th CPSU Congress.

Long before the start of their vacation, thousands of people put the same question to themselves: "Where to go for a vacation?" The answer may be a dot on the map

in any part of our country; institutions for sanatorium and resort treatment and rest have been established in all republics, krais and oblasts.

We should like to call attention to the fact that the network of health institutions has broadened, not only in such long-since popular vacation sites as the Caucasus, Crimea, Transcaucasia, Baltic region, but in Kazakhstan, Central Asia, central and nonchernozem regions of the Russian Federation, Moldavia, Belorussia and other parts of our country. Special attention has been given to development of resorts in Siberia, the Urals and Far East. New sanatoriums have been started up at the resort towns of Belokurikha in Altayskiy Kray, Sadgorod in Primorskiy Kray, Ozero Uchum [Lake Uchum] in Krasnoyarskiy Kray, Ust-Kachka in Permskaya Oblast, Kul'dur in Khabarovskiy Kray and Darasun in Chitinskaya Oblast. Residents of eastern regions do not have to waste time on distant trips. In addition, treatment and rest under customary climate conditions are often more effective.

There are also quite a few pleasant new facilities in the Nonchernozem Zone of RSFSR: new sleeping wings received vacationers at the Khilovo resort in Pskovskaya Oblast, at the Sosnovyy Bor sanatorium in Vladimirskaya Oblast, at the Solotcha rest homes in the Ryazan' area and many others.

With reference to organization of sanatorium and resort therapy, it must be stressed that it is administered on a strict scientific basis. A total of 14 institutes, headed by the Central Scientific Research Institute of Resort Therapy and Physiotherapy of the USSR Ministry of Health, are studying the mechanism of effects of resort factors on man and developing effective methods of using them. Research on these problems is also being pursued by scientists at medical VUZ's and a number of institutes and laboratories under the USSR Academy of Medical Sciences. Scientific research laboratories of balneology have been organized under some councils of trade-union resort management. They exist at resorts in Latvia, Lithuania, in Kislovodsk, as well as Belokurikha in Altayskiy Kray.

Specialization of sanatoriums has now been completed. At the present time, each of them has a specific therapeutic specialty. There are special departments for patient rehabilitation, in particular, for those who have suffered myocardial infarction. Thanks to clearcut specialization, there has been an appreciable improvement of efficacy of treatment.

Plant health centers are gaining more and more popularity. They play a special part in prevention and treatment of diseases. Without leaving their daily job activity, blue and white collar workers undergo courses of therapy and receive optimum nutrition at such sanatorium-preventoriums. Travel passes are issued by the trade-union committee either without cost or at a reduced price.

We are developing construction of hydrotherapy and mud therapy facilities of the resort type in large industrial cities so that workers in those cities can obtain these services without interrupting their work or leaving home. Such facilities have already been opened in Krasnodar, Omsk, Kuybyshev and Saratov.

Very recently, on 13 May, our country celebrated the 60th anniversary of Lenin's decree on "Rest Homes." The first of these was organized at the initiative of Vladimir Il'ich in Podmoskov'ye [Moscow suburbs], then in one of the palaces of Petrograd on Kamenny Island. This new type of health institution became popular immediately: the year of its conception about 100,000 people had spent time in it. Today, such vacationers number several million people.

The appropriate material base has been provided by trade-unions for continued advancement of the therapeutic and preventive role of rest homes and boarding houses: space and equipment has been organized in all rest institutions for sun baths, air and hydrotherapy, river, lake and sea swimming, combining the entire armamentarium of physical culture and sports. Dental offices, physiotherapy and massage rooms have been opened in many rest homes and boarding houses, and there are sun rooms [photariums], particularly in northern and eastern regions where the summer is short.

This season will also gladden the numerous people in favor of family vacations, which are enjoying increasing popularity with each passing year. The first such rest homes were opened in 1972 with 25,000 accommodations. At present they can already accommodate 116,000.

Organization and upgrading family vacations have always been the focal point of attention of the AUCCTU and Central Council for Management of Trade-Union Resorts. As a result, many problems related to better vacations for parents and children have been resolved in recent years. In particular, amenities and equipment have been improved at such health centers; the best conditions have been provided for active recreation, physical culture and sports; there has been significant improvement of therapeutic and preventive work; the procedure has been established for issuing travel orders [passes], whereby they are issued to workers together with their families at only 30% of the cost of travel, or else without cost when they are paid for by the State Social Insurance funds.

Additional regular staff is provided for such vacation institutions, with regard to pediatricians, nurses, educators and service personnel.

It should be noted that there has been further development in the last few years of sanatoriums for parents and children. They have been started up at the resort towns of Morshin, Belokurikha, Kul'dur and in Moscow. Eight more sanatoriums for parents and children will be erected with the funds earned on a day of unpaid mass work [usually on the workers' day off].

There are also vast opportunities for family vacations at the vacation [rest] centers of enterprises.

We know that there is a traditional increase in number of people who wish to improve their health and receive some treatment during the summer months. The teams of workers at sanatorium and resort institutions hasten to prepare themselves as well as possible by the start of this season, in order to receive these people well. Those who have arrived this season in our health centers have already noticed signs of renovation: the sleeping wings, treatment and dining rooms have been redecorated, and landscaping has improved. In many resort areas, centers that provide a variety of services have been built or remodeled.

With reference to all this, we cannot fail to mention the work of builders, upon whom expansion of the network of health institutions and their amenities depends to a significant degree.

Under the last five-year plan, many new health centers in different corners of our country, with a total of more than 70,000 beds, opened their doors to welcome guests; about a billion rubles of capital investments have been spent. In addition, sleeping wings with 105,000 beds, dining rooms with space for 80,000 people and other facilities have been redecorated.

However, the advances would be more perceptible if contracting organizations were to fulfill the plans put to them for sanatorium and resort construction.

Plan shortfalls have become a chronic diseases of builders. Again, the USSR Ministry of Industrial Construction has not implemented the start up of the 420-bed Tinaki resort in Astrakhanskaya Oblast and Sevan 347-bed rest home in Armenia; the USSR Ministry of Power and Electrification has failed to finish the 500-bed Izhevsk mineral water resort in Tataria; the USSR Ministry of Construction has not finished the 250-bed resort Khodzha-Obi-Garm in Tajikistan and this also applies to other projects.

The results of work done last year indicate that the number of overdue resort construction projects is diminishing slowly. For example, the plan of the Ministry of Industrial Construction lists many projects that have been under construction for a long time, including two that have been under construction for over 10 years--the resorts of Bol'shoy Taraskul' in Tyumenskaya Oblast and Novoye Uso'lye in Irkutskaya Oblast.

The party has put to builders the task of building rapidly, economically and on a high technical level under the new five-year plan. We also request that the administrators of construction ministries and agencies take immediate steps to finish the long overdue resort projects and reduce the number of "incomplete" projects to the standard level.

While making demands of others, we cannot fail to mention flaws in our own work. We have received letters from patients and vacationers at some health centers, expressing their dissatisfaction with organization of treatment, nutrition, mass cultural activities and services. Constantly improving the sophistication of services is one of the most important of our tasks. This is a multilevel task. Aside from questions of management of medical, personal and cultural services for patients and vacationers, it also includes problems such as limiting traffic in resort towns, noise control, amenities, including beaches, parks, development of the network of trade enterprises, public catering, and organization of servicing worker families who come on vacation without travel orders. The councils for management of trade-union resorts are solving and will continue to solve these problems in close collaboration with the ispolkoms of municipal councils of people's deputies.

There are more than 260,000 people employed in the sanatorium and resort system of trade-unions. There is no doubt that they will do everything possible to assure proper rest and highly qualified treatment for the working people, and that they will fulfill the tasks outlined by the 26th congress of our party.

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MORBIDITY AND MORTALITY REFERABLE TO CERVICAL CANCER IN THE USSR

Leningrad VOPROSY ONKOLOGII in Russian Vol 27, No 3, Mar 81 pp 8-12

[Article by V. M. Merabishvili and Ya. V. Bokhman, "Order of Red Banner of Labor" Scientific Research Institute of Oncology imeni Prof N. N. Petrov, USSR Ministry of Health]

[Text] It is impossible to make a correct evaluation of measures used to control malignant neoplasms or choose the optimum directions of such control without constant statistical monitoring of the existing situation, studying the patterns of distribution and dynamics of malignant neoplasms, including cervical cancer [8], which holds a leading place in oncogynecology.

The incidence of cervical cancer in different countries fluctuates over a considerable range. Such differences can be attributed to the dissimilar age-related structure of the population, differences in keeping records of patients, as well as sociohygienic factors [1, 2, 6].

In the last few years, oncological morbidity among the female population of our country has moved to fourth place, its former third place having been taken by breast cancer [5].

The significantly higher indicators of morbidity than death rate referable to cervical cancer in different countries (Figure 1) are indicative of the possibility of effectively treating tumors with this localization [13]. The extensive summary data of the International Federation of Gynecologists and Obstetricians indicate that these rates have been dropping slowly in the last 10-15 years. Five-year survival does not exceed 50-60% in the presence of grade II-III of this malignancy. At the same time, it was established that 5-year cures constitute up to 95-98% in the case of detection of cervical cancer at the *ca in situ* stage, or grade Ia (micro-invasive carcinoma).

We are witnessing the efficacy of the enormous work being done in our country on early detection of preneoplastic diseases with reference to mass scale preventive screening of the female population with the use of cytological tests. There are two levels of prevention of cervical cancer: 1) detection and treatment of background processes (pseudoerosion, dyskeratosis, polyps); 2) diagnosis and treatment of dysplasia and preinvasive carcinoma, which prevents development of invasive carcinoma. In turn, diagnosis of pathology of the cervix is divided into two stages: 1) primary detection, screening of patients as opposed to healthy subjects, which is done through gynecological examination and cytological tests; 2) in-depth

diagnostics by means of colposcopy, cytological and histological tests [1]. The intensive development of the cytological service in our country will provide for improved efficacy of prevention of cervical cancer in the next few years, and this will be instrumental in retaining the existing trend toward decline of morbidity and mortality.

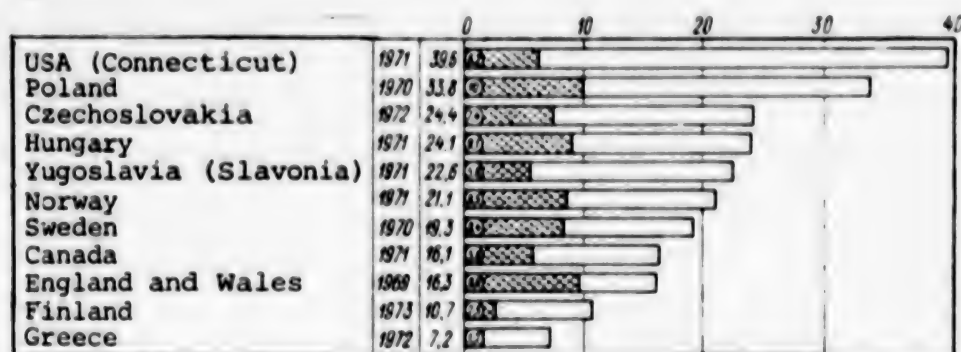


Figure 1. Morbidity and mortality in some countries referable to malignant cervical neoplasms (per 100,000 women). Cross-hatched part of columns--mortality; entire length of columns--morbidity.

Calculation of standardized rates [12], which eliminate the difference in age composition of women, is indicative of more intensive decline of cervical cancer in the compared years (Figure 2).

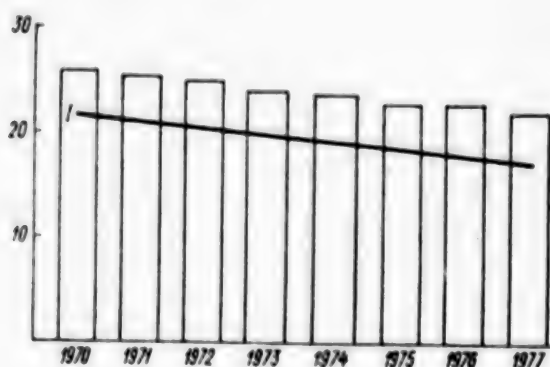


Figure 2.

Incidence of malignant neoplasms of the cervix in the USSR (per 100,000 women)
1) standardized rate (M. Segi, 1966)

However, in some age groups of the female population of the USSR, the dynamics of morbidity referable to cervical cancer present their own distinctions. The most significant decline of age-related coefficients of morbidity in 1970-1977 was observed in the 40-49 and 50-59-year age groups, where the morbidity rates dropped by 28.3 and 15.3%, respectively. At the same time, a rise was recorded in this period for older age groups: by 7.6% for the 60-69-year group and 5.2% for women 70 years of age and older (Table 1). The lack of decline of morbidity at an elderly age could be attributed to the still existing low coverage of women over 60 years of age by preventive examinations.

The maximum incidence of cervical cancer in 1977 was referable to the group 60-69 years of age--71.9 ‰.

Analysis of the data in Table 1 confirmed the desirability of mass scale preventive gynecological examinations starting at the age of 30 years; however, if conditions for clinical and cytological screening are available, it is desirable to start even

earlier, at 20 years of age, since there is a high incidence of background processes, dysplasia and preinvasive carcinoma in the 20-29-year age group.

Table 1. Age-related morbidity rates referable to malignant neoplasms of the cervix among women in the USSR (1970-1977)

Year	Age, years						usual rate	Overall	
	20-29	30-39	40-49	50-59	60-69	70 & older		standardized rate	absolute number
1970	0.5	13.5	50.8	85.8	66.0	34.5	26.0	21.4	33 960
1971	0.6	12.7	49.0	85.0	66.7	36.0	25.7	21.2	33 992
1972	0.5	12.2	44.6	82.3	70.2	36.8	25.1	20.5	33 464
1973	0.5	11.5	41.4	81.4	69.3	35.7	24.3	19.8	32 669
1974	0.5	12.3	39.8	78.0	72.4	36.8	24.1	19.4	32 611
1975	0.6	12.4	36.4	72.7	71.0	36.4	23.3	18.7	31 761
1976	0.6	11.8	33.7	69.6	71.8	37.4	22.8	18.2	31 314
1977	0.6	11.9	31.2	65.4	71.9	36.7	22.2	17.4	30 707

Table 2. Morbidity referable to malignant neoplasms of the cervix in the USSR and Union republics from 1970 to 1975 (per 100,000 population)

Union republics	Year							
	1970	1971	1972	1973	1974	1975	1976	1977
USSR	14.0	13.8	13.5	13.1	12.9	12.5	12.2	11.9
RSFSR	15.7	15.7	15.2	14.8	14.6	14.2	13.9	13.4
Ukrainian SSR	15.3	15.1	15.0	14.3	14.5	13.9	13.6	13.2
Belorussian SSR	9.5	9.4	9.4	9.0	9.7	9.1	9.2	8.9
Uzbek SSR	5.3	5.7	5.1	4.8	4.9	4.7	4.5	4.5
Kazakh SSR	12.7	11.9	11.7	11.8	11.5	10.2	9.8	9.9
Georgian SSR	8.2	7.9	7.6	7.5	7.2	7.7	7.7	7.0
Azerbaijan SSR	6.0	6.3	6.6	5.2	4.8	5.0	4.9	4.8
Lithuanian SSR	13.5	12.6	12.9	12.2	12.0	11.3	12.6	10.9
Moldavian SSR	14.7	14.3	13.6	14.5	13.8	12.6	12.9	13.3
Latvian SSR	16.0	14.3	14.5	13.6	13.7	15.6	14.1	14.4
Kirghiz SSR	12.4	10.9	11.8	11.4	11.3	10.2	8.9	8.3
Tajik SSR	4.5	4.3	4.3	4.4	4.5	3.6	4.1	3.8
Armenian SSR	7.8	8.3	8.7	8.6	8.5	8.4	7.9	9.2
Turkmen SSR	8.4	8.3	9.8	8.6	6.2	7.6	6.6	6.1
Estonian SSR	12.7	14.5	14.3	14.4	11.9	11.9	12.4	11.9

According to the data of the Institute of Statistical and Epidemiological Cancer Research of Finland, the mean age at which cervical cancer was present constituted 56.6 years in Finland, in 1972 [10]; the analogous index, calculated by N. Mourali [11] for cancer in countries of the east Mediterranean ranged from 48.6 to 57.5 years. In the USSR, the average age of women when they first contracted cervical cancer was 57.5 years in 1977.

Table 2 illustrates the dynamics of "crude" specific morbidity rates in different Union republics for the period between 1970 and 1977. Typically enough, there was a decline of incidence of cervical cancer in all republics, with the exception of Armenian SSR. The highest incidence of cervical cancer was found in the RSFSR, Ukraine, Baltic republics and Moldavia, where it ranged from 15.4 to 10.9 ‰, and the lowest levels were recorded in Tadzhikistan, Uzbekistan and Azerbaijan, from 3.8 to 4.8 ‰, i.e., in republics with a high birth rate. These data

do not confirm the traditional conception of the role of a high birth rate in onset of cervical cancer. Calculation of standardized rates alters the levels of specific [intensive] morbidity rates in different republics, with reference to cervical cancer; however, the lowest rates are retained in Tajik, Azerbaijan, Georgian and Uzbek SSR (Figure 3).

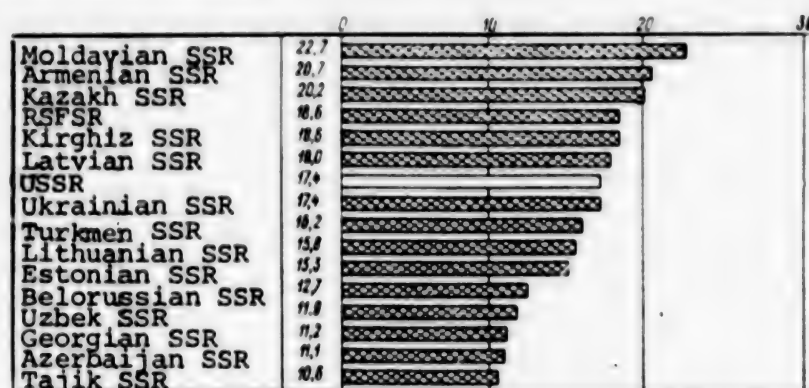


Figure 3. Standardized morbidity rates referable to cervical cancer (M. Segi, 1966) among women of the USSR and Union republics

Analysis of the dynamics of patients groups under dispensary observation is indicative of intensive increase therein. This growth constituted 23.7% for the period of 1970-1977 alone (Table 3).

Table 3. Dynamics of patients on the rolls of oncological institutions of the USSR for cervical cancer (system of the USSR Ministry of Health [4, 5])

Year	Absolute number of oncological patients on rolls as of end of indicated year	Per 100,000 women		Deaths among those on rolls less than 1 year as related to number of new cases	Index of accumulation of cohorts (ratio of total cases to new cases)
		Total on rolls	those on rolls for less than one year		
1970	260,724	106.9	12.6	11.9	8.0
1975	309,448	121.1	11.3	12.1	9.9
1976	316,512	122.7	10.9	11.7	10.4
1977	322,514	124.0	10.6	11.6	10.7

There was also a drastic rise of prevalence (incidence) of cervical cancer over the above period, from 106.9 to 124.0 ‰ or by 16%. At the same time, calculation of this rate for women on the dispensary rolls for less than 1 year showed a decline to 10.6 ‰, which is probably related to the overall trend of decline in incidence of cervical cancer. The extremely high level and growth of index of accumulation of cohorts (IAC) [groups] suffering from cervical carcinoma are indicative of significant advances in the treatment of cervical cancer on the national scale. In 1977, IAC constituted 10.7, and it increased by 33.7% only after 1970.

The share of mortality in the USSR referable to cervical cancer in the period from 1970 to 1977, in relation to all deaths due to malignant neoplasms, dropped from 3.9 to 3.5%, while in relation to malignant neoplasms of female reproductive organs it dropped from 42 to 39.3% [3, 7].

The incidence of cervical cancer dropped from 5.0 to 4.8 ‰, while the trend toward rise in mortality in the USSR referable to malignant tumors of female reproductive organs (from 11.9 ‰ in 1970 to 12.1 ‰ in 1977) persisted.[4, 5, 9]

It is important to study morbidity and mortality referable to malignant neoplasms constantly in order to plan cancer control measures.

The fact that there has been some decline in incidence of cervical cancer and mortality, which has occurred in the last few years, as well as rise of patient survival rate, is indicative of the advances made in the difficult control of this disease. However, it is imperative to wage broader cancer-control campaigns, as well as to refine methods of early detection with mandatory cytological tests, with prompt treatment of background processes, dysplasia and preinvasive carcinoma of the cervix, which will undoubtedly enable us to achieve an even more significant decline of morbidity and death rates.

BIBLIOGRAPHY

1. Bokhman, Ya. V., "Symptomatology and Treatment of Cervical Cancer," Kishinev, "Shtiintsa," 1976.
2. Glebova, M. I., "Cancer of the Uterus," Moscow, 1977.
3. Napalkov, N. P., Tserkovnyy, G. F., Merabishvili, V. M., Preobrazhenskaya, M. N., Shabashova, N. Ya. and Guliyeva, L. M., "Death Rate Referable to Malignant Neoplasms in the USSR," VOPR. ONKOL., Vol 23, No 1, 1977, pp 3-12.
4. Napalkov, N. P., Tserkovnyy, G. F., Merabishvili, V. M. and Preobrazhenskaya, M. N., "Incidence of Malignant Neoplasms and Organization of Medical Care of Oncological Patients in the USSR in 1974," Ibid, Vol 23, No 2, 1977, pp 3-24.
5. Idem, "Distinctive Features of Morbidity in the USSR Referable to Malignant Neoplasms in 1977," Ibid, Vol 26, No 4, 1980, pp 43-62.
6. Serebrov, A. I., "Cancer of the Uterus," Leningrad, 1968.
7. "Mortality in the USSR Referable to Malignant Neoplasms in 1973 and 1974 (Statistical Data)," VESTN. STATISTIKI, No 12, 1975, p 88.
8. "Statistical Classification of Diseases, Trauma and Causes of Death," (8th revision of the 1965 International Classification of Diseases), Moscow, 1969.
9. Tserkovnyy, G. F., Napalkov, N. P., Berezkin, D. P., Preobrazhenskaya, M. N., Shabashova, N. Ya. and Mirotvortseva, K. S., VOPR. ONKOL., Vol 21, No 1, 1975, pp 3-16.
10. "Cancer Incidence in Finland, 1972," Helsinki, 1975.

11. Mournali, N., "Cancers of the Uterus in Eastern Mediterranean," "Cancer of the Uterus," WHO, Can 76, 6 Monaco, 1976, pp 9-15.
12. Segi, M., "Cancer Mortality for Selected Sites in 24 Countries," Japan, 1966.
13. "World Health Statistics Report," No 7, 1974.

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CSO: 1840/202

FEMALE REPRODUCTIVE FUNCTION AND REASONS FOR ABORTIONS

Minsk ZDRAVOOKHRANENIYE BELORUSSII in Russian No 5, May 81 pp 25-27

[Article by I. M. Starovoytov, G. I. Gerasimovich, N. M. Matrusova and G. A. Lukashevich, Department of Obstetrics and Gynecology (headed by Prof G. I. Gerasimovich), Minsk Medical Institute, submitted 25 Feb 80]

[Text] The reproductive function of women is related to the distinctions of the female body, the state of its endogenous and exogenous environment. The social transformations that have occurred in our country in recent years have altered significantly the position of women. Of all employable women 18 to 25 years of age, 93.5% are employed or studying (S. L. Polchanova, 1973). The tendency toward deliberate regulation of child bearing is being manifested more and more distinctly.

At the present time, there are many effective contraceptives; however, some couples avoid their use, preferring abortion or other unreliable and harmful methods of protection. Few women seek medical consultations in the area of contraception.

Abortion, as a sociological and medical problem, has drawn the attention in recent years of scientists and government agencies, and it is an important issue of public health (WHO, 1974). Socioeconomic, domestic and living conditions, industrial and ethical [moral] factors, as well as traditions and customs are involved in limiting pregnancies and births (including the incidence of abortions), and many of these factors have a combined effect. In spite of the general laws regulating abortions in our country, the incidence thereof is different in different regions, as is the birth rate.

The medical aspects of abortions have been studied comprehensively by L. M. Garshanova (1974), V. V. Bodrova (1975) and others. In recent years, studies of the chief causes for preventing pregnancy and for abortions were studied in the Department of Obstetrics and Gynecology of the Minsk State Medical Institute on 4000 women. The pregnant women who requested abortions were under 20 years of age in 4.7% of the cases, 20-40 years old in 92.6% and over 40 in 2.7%.

In recent years, there has been an increase in number of adolescent school girls and minors studying at GPTU [city polytechnical schools] who have not reached puberty among those obtaining abortions. Particularly difficult situations arise when girls 14-16 years of age are advanced in their pregnancy, when it is impossible to terminate it in a one-stage procedure. In such cases, a miscarriage has to be induced on the order of premature labor, which involves a health hazard to the adolescents. Such situations occur most often in homes where the moral

and living conditions are poor, when the parents and school do not pay sufficient attention to upbringing (particularly sex education) of young men and girls.

The start of menstruation reflects a certain stage of sexual development of women, but not the start of sexual maturity. Menarche occurred in 10% up to 12 years of age, 46.6% at 13-14 years, 20.1% at 15, 15.8% at 16 and in 7.5% of the young girls after the age of 16 years. We were impressed by the relatively frequent (23.3%) occurrence of the first menstruation at 16 years of age or more. This was observed mainly in women who underwent puberty during the war years or difficult postwar years. However, according to our data, a late menarche did not affect formation of a family or reproductive function of these women.

A sexual drive reflects maturity of the body to a significant degree, although in the last few years it has often appeared in adolescent girls, usually 2-3 years after the start of menstruation. According to our data, a sex drive appeared at up to 15 years of age in 1%, at 16 in 8.2%, at 17 in 21.7%, at 19-20 in 33.5%, at 21-25 in 31.9% and beyond 25 years of age in 3.7% of the young girls. According to the data of N. F. Lyzikov, 10.7% of the women have no sex drive at all.

Sex life has a direct effect on the reproductive function of a woman. Most women (85%) began to have a sex life upon reaching puberty--at the age of 18 years, in 10.8% at 16-17 years of age and 4.2% at up to 15 years. When young women 16-17 years of age are physically well-developed and spiritually ready for motherhood, individual talks should be held with them concerning the desirability of continuing a pregnancy.

The family situation plays an exceptional role in birth control. Of all the women who requested abortions, 89.5% were legally married, 6% lived as married couples and 5% were sexually active without being married. They requested interruption of pregnancies more often than the others.

In the most favorable family conditions, women have fewer abortions. Good marital relations were noted (according to the history) in 57.3% of the women, favorable in 11.6%, mediocre in 18.8% and poor in 3.9%.

All adult family members were informed about the proposed abortion in 97.2% of the cases, and 58.3% of the women were given approval by their husbands. The family's attitude toward a proposed abortion, as well as the feeling of anxiety before the operation and because of the loss of the future child, often create a difficult psychological background, which affects the woman's health and work performance.

The problems with upbringing future children are largely related to the shortage of preschool children's institutions. According to our data, the existing ones can handle only 53.1% of the children (mainly in urban regions). Evidently, one should raise the question of organizing such institutions at all kolkhozes and sovkhoses.

The women's working conditions have some bearing on child rearing. In our studies, this factor was mentioned as the reason for limiting child bearing by only 1.2% of the women. This indicates that good working conditions have been provided at enterprises for most working women.

Unfortunately, many resort to abortions as a means of family planning. Many women have had repeated abortions. Thus, 12.6% of the women had one abortion, 33.2% had 2, 25.3% had 3, 12.6% had 4, 5.4% had 5, 5.9% had 6 and 5% had 7 or more. Some women have had 10-20 abortions. The women's attitude toward pregnancy after an abortion was as follows: it was wanted by 29.4%, unwanted by 64% and 6.6% did not have a definite opinion. Women who had no children or only one child expressed their desire to be pregnant and bear children after abortions. Of the women who had one child, 16.1% did not want to have more. The main group of women who did not want children after an abortion consisted of women who already had two or more children. Of the women who had abortions, 5.8% had never borne children; 40.1% had 1 child, 40.2% had 2, 7.8% had 3, 3.3% had 4, 1.4% had 5 and 1.4% bore 6 or more.

In 47.7% of the cases, the pregnancy was interrupted within 6-8 weeks, in 50.2% in the 9th-10th week and 2.1% after the 12th week.

In 15.2% of the cases, the reason for the abortion was unwillingness to have children at that time, in 2.1% it was the age and the fact they already had many children, in 22.6% there were marital and domestic factors involved, in 12.2% the reason was that there were infants in the family, in 5.4% it was illness of the husbands, in 3% conflicts in the family, in 1.9% it was involvement in education, in 2.9% the reason was an extramarital pregnancy and in 32.2% of the cases there were no convincing reasons for the abortions. Virtually all of the above-mentioned reasons were temporary, and as they are eliminated the probability of reduction in number of abortions increases, while the birth rate rises.

The large number of abortions has some detrimental effect on the national economy. Following an abortion, women stay away from work and home-making for a long time because of the time required to convalesce after the operation and existence of numerous serious postoperative complications. For this reason, the immediate objective for medical institutions is to reduce the number of abortions.

Women's consultation offices and health education centers should play an important part in this regard, and part of their task is to prevent unwanted pregnancies. Women who have two or more children, who have had frequent abortions, women with postpartum physiological amenorrhea, unmarried women and others constitute a reserve for lowering the number of abortions. First of all, it is imperative to improve the quality of health education [propaganda]. It should consist of the most diverse forms: individual talks, lectures, articles in the press, messages delivered over radio and television, organizing rooms ["corners"] for new mothers, newlyweds, fathers, etc. It is imperative to explain the harm of an abortion, its serious moral and physical consequences. The entire female population of the republic of child-bearing age should be reached by health education. Early, regular and proper use of contraceptives is another equally important means of preventing abortions. There must be intensification of the work dealing with prevention of pregnancy done by obstetric and gynecological institutions for the purpose of broader dissemination of birth control methods. It must be borne in mind that many women do not have even elementary knowledge about sex hygiene and contraception methods; they have no faith in the efficacy of contraceptives and underestimate the seriousness of possible consequences of an abortion, particularly in the case of the first pregnancy; they do not know how to use contraceptives; in a number of cases, women do not have the correct idea about the rhythm method and physiological postpartum amenorrhea, etc. All this must be taken into consideration by obstetricians and gynecologists in their work at medical institutions in the republic.

BIBLIOGRAPHY

1. "Abortion as a Public Health Problem: Report of WHO Working Group," Copenhagen, 1974.
2. Bodrova, V. V., ZDRAVOOKHRANENIYE ROSSIYSKOY FEDERATSII, No 5, 1975, p 34.
3. Garshanova, L. M., ZDRAVOOKHRANENIYE BELORUSSII, No 3, 1974, p 54.
4. Polchanova, S. L., in "Trudy tsentr. NII sanitarnogo prosveshcheniya" [Works of the Central Scientific Research Institute of Health Education], Moscow, 1973, p 36.

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CSO: 1840/205

BRIEF

COMPLAINT ON ATROCIOUS HOSPITAL CONDITIONS--Urgench. When you are in our city, oh wise one, please visit the Oblast Infectious Diseases Hospital. You will be convinced that it is impossible to know the creator of this kind of order. Adult patients are assigned to wards for mothers who are nursing infants. All day long, cries and noise assail the nerves of a healthy person. What must be the effect on a sick person? In many rooms it is dirty and uncomfortable. In the first and second wards it is impossible to open the windows because of the grime. Patients are afraid to place food in the cockroach-infested night tables. There are more flies than you know what to do with and going into the bathroom is revolting. Could it be that the hospital was named "Infectious" because it has become a breeding ground for infection? [Text] [Tashkent PRAVDA VOSTOKA in Russian 24 Jun 81 p 4]

CSO: 1800/801-A-P

UDC 616.988.25-022.395.42:313.13]-078(571.62)

CLINICAL-VIROLOGICAL ANALYSIS OF THE INCIDENCE OF TICK-BORNE ENCEPHALITIS IN
Khabarovskiy Kray

Moscow ZHURNAL NEVROPATOLOGII I PSIKHIATRII IMENI S. S. KORSAKOVA in Russian
Vol 81, No 2, Feb 81 (manuscript received 18 Feb 80) pp 41-43

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Microbiology

[Abstract] The question of whether the cyclic rises of the incidence of tick-borne encephalitis during some years are accompanied by a more severe course of the infection was investigated with respect to the occurrence of the disease in Khabarovskiy Kray. The incidence of tick-borne encephalitis can be distributed by a series of three-year cycles, which includes a year of high incidence, the year following the rise and the year preceding the increase of incidence. The greatest number of cases of tick-borne encephalitis have been recorded in the coniferous and broad-leaved forest zones. Severe clinical forms, manifested by meningoencephalitic and bulbar spinal forms, predominate during years of a cyclic rise. The cyclic nature of the disease has also been noted in other landscape-epidemiological regions. The highest incidence of tick-borne encephalitis has been noted in Primorskiy Kray. The number of patients with severe forms of the disease is higher during years of the cyclic rise of the disease than during years following the rise. Strains can be isolated from the blood of patients and the brain of those dying from the disease more frequently during years of the cyclic rise.

References: 7 Russian.

[209-6521]

EPIDEMIOLOGICAL CHARACTERISTICS AND ANALYSIS OF ANTIGENIC PROPERTIES OF STRAINS OF
FLU VIRUS THAT CAUSED THE 1979 EPIDEMIC

Kishinev ZDRAVOOKHRANENIYE in Russian No 2, Mar-Apr 81 (manuscript received 7 May 80)
pp 15-17

PROKA, L. M., ZAKSTEL'SKAYA, L. Ya., YAKHNO, M. A., MOLIBOG, Ye. V. and
MALOVATA, S. K., Institute of Virology imeni D. I. Ivanovskiy, USSR Academy of
Medical Sciences, Moscow, and Moldavian Scientific Research Institute of Hygiene
and Epidemiology

[Abstract] The etiological structure of the outbreak of flu and other acute
respiratory infections occurring in Kishinev in Nov-Dec 1979 is given and some
aspects of the epidemiological characteristics are outlined. Material from 145
patients was assembled and examined during the period 1978-1979 in Kishinev. The
sick rate indicator during the first week of the epidemic comprised 147.4 per
10,000 population and was 1.5 times higher than during the week preceding the
outbreak. The epidemic distribution of flu A viruses related to variety A/H3N2/
and a similar but not identical variety A/Texas/1/77 was responsible for the rise
of acute respiratory infections during the period under investigation.

[214-6521]

UDC: 616.988-085.281.8

PRESSING PROBLEMS OF CHEMOTHERAPY OF VIRAL INFECTIONS

Moscow FARMAKOLOGIYA I TOKSIKOLOGIYA in Russian Vol 44, No 3, May-Jun 81
(manuscript received 1 Dec 80) pp 261-270

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[Abstract] This is a survey of current directions of research dealing with the control of viral infections, for which more than 400 pathogens have now been described. The agents that are being given the most attention at the present time are listed in groups and described: analogues of purine and pyrimidine nucleosides; benzimidazole derivatives; derivatives of five-component [member] azaheterocyclic agents; other heterocyclic compounds; aldehydes, ketones, and carbonyl group derivatives thereof; aliphatic and alicyclic amines; aldehyde and ketone thiosemi-carbazones; polyoxo compounds; phenols and their derivatives; organophosphorus compounds; amino acids and their analogues; modified sugars; interferon and its inductors. Chemotherapy of viral infections is one of the most important directions in the control of pathological processes in man, animals and plants, which is why development of new chemotherapeutic agents is extremely important, although some progress has been made in the area of vaccinations against some of these infections, such as smallpox and polio. There is also increasing confirmation of the viral etiology of malignant neoplasms. References 55: 20 Russian, 35 Western.
[203-10,657]

HISTOPATHOLOGICAL CHARACTERISTICS OF Legionella pneumophila INFECTION IN HUMANS AND GUINEA PIGS

Moscow ARKHIV PATOLOGII in Russian Vol 43, No 4, Apr 81
(manuscript received 29 Apr 80) pp 18-25

KOKORIN, I. N., YERUSLANOV, B. V., TARTAKOVSKIY, I. S., PETROSOV, V. V. and PROZOROVSKIY, S. V., Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy of Medical Sciences, Moscow

[Abstract] Current data on the histopathology of Legionnaires' disease (LD) is reviewed. The clinical presentation with rapidly progressing focal and lobar pleuropneumonia and the radiological findings of lung tissue consolidation are also evident in the histopathology of lungs upon autopsy. The histopathological picture of the lungs is characterized by presence of acute diffuse and focal lesions and frequently lobar pleuropneumonia with neutrophil and macrophage fibrinous exudate in alveoli with cellular necrobiosis. Interstitial necrosis with hemorrhaging but without inflammation of vascular walls or large bronchi is also sometimes present. Pneumonia during LD resembles bacterial pneumonia but differs in that the causal agent cannot be isolated from the sputum or exudate by conventional staining methods. LD cannot be diagnosed on the basis of histopathological changes alone, and L. pneumophila is identified by special staining procedures (impregnation with silver) and immunological and microbiological methods. It is recommended that all patients with a possible diagnosis of LD be given erythromycin and rifampicin even before a conclusive laboratory diagnosis. LD may be suitably modeled on guinea pigs. In guinea pigs, infected intraperitoneally with 100 cell-forming units of L. pneumophila Phil-1 per milliliter, LD proceeds with a manifest endotoxin-induced toxicosis, necrobiotic changes in the lungs, liver and spleen, and a weak cell response. Detailed instructions for preparing sections and reagents and staining specimens are included. Figures 2; references 18:
2 Russian, 16 Western.
[221-9307]

AEROSOL THERAPY IN ACUTE RESPIRATORY DISEASES (A LITERATURE REVIEW)

Moscow VOYENNO-MEDITSINSKIY ZHURNAL in Russian No 4, Apr 81 pp 43-45

FINOGEYEV, Yu. P., candidate of medical sciences, col medical service

[Abstract] Since the basic pathological processes in acute respiratory diseases (ARD) occur in the mucosa lining the upper respiratory tract, aerosol therapy, which acts directly and uniformly on the mucosa surface, has become part of the complex treatment of patients with ARD. Drugs administered in this way reach infection foci not readily penetrated by drugs administered by other routes. An indication for aerosol therapy is limitation of bronchial patency resulting from spasms, mucosal swelling, and excess accumulation of fluids. Aerosol therapy is generally initiated upon hospital admission; treatment sessions may last up to 15 min. Medications used in aerosol therapy include: bronchodilators (Euphyllin, ephedrine hydrochloride), alkaline saline solutions, mucolytic agents (trypsin, pancreatin), and antibiotics, which are indicated in bacterial superinfections. The article lists specific dosages for a variety of antibiotics. References 20: 16 Russian, 4 Western.

[229-9307]

UDC 612.591.1-06:613.735

EFFECT OF PHYSICAL TRAINING ON THE RESISTANCE OF THE HUMAN BODY TO HIGH TEMPERATURE

Moscow VOYENNO-MEDITSINSKIY ZHURNAL in Russian No 4, Apr 81 pp 51-53

SULIMO-SAMUYLLO, Z. K., doctor of biological sciences, BAGROVA, N. D. and
YENDAL'TSEV, B. V., candidate of biological sciences

[Abstract] The response of physically-active (10 subjects) and inactive (24) individuals to stress tests at 40°C and 25-30% relative humidity was evaluated to study the resistance of an unadapted individual to a high temperature. The physically-trained subjects were able to handle a 250-W stress test 1.5 times longer. Their working capacity was stimulated by an increased oxygen supply, and their cardiovascular and respiratory functions recovered more rapidly. In untrained subjects, adaptation to these conditions occurred primarily as a result of an increase in heart activity. Capacity for mental work decreased in untrained subjects, and the differential threshold of the auditory analyzer and sensorimotor response were higher. Indices of mental activity were more stable in trained subjects. The differences found in the functional state of the nervous and autonomic systems in response to the high temperature and physical stress are related to differences in the mobilization of compensatory physiological responses. Body resistance during initial adaptation of an unadapted individual to a high temperature may be increased by 20-30% by physical training. References: 4 Russian.
[229-9307]

INTERACTION OF BRAIN STRUCTURES THAT REGULATE THE VOCAL AND RESPIRATORY SYSTEMS

Leningrad FIZIOLOGICHESKIY ZHURNAL SSSR IMENI I. M. SECHENOVA in Russian Vol 67, No 5, May 81 (manuscript received 26 Mar 80) pp 725-731

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[Abstract] The changes in respiration upon stimulation of the brain structures that control sound generation were studied and the neuron reactions in these same structures upon vocalization and readjustment of respiration were investigated in chickens. A close relationship was shown between the vocal and respiratory systems. The variation of the induced vocal reaction and the variation of respiration are both dependent on the structure to be stimulated and the current parameters. The structures that control sound generation can be included in regulation of respiration. The neurons that increase or decrease the frequency of discharge during sound generation are present in the diencephalic and mesencephalic structures that control vocalization. Expiratory and inspiratory neurons that function during vocalization and respiration were found in the center of the medulla oblongata. Neurons stimulated by pulses simultaneously with respiration are present in both the medulla oblongata and in the mesencephalon. Figures 5; references 14: 5 Russian, 9 Western.
[218-6521]

UDC 612.789

PAUSE PERCEPTION IN SPEECH-LIKE SIGNALS

Leningrad FIZIOLOGICHESKIY ZHURNAL SSSR IMENI I. M. SECHENOVA in Russian Vol 67, No 5, May 81 (manuscript received 7 Jul 80) pp 720-724

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[Abstract] Experimental data were obtained for selecting one of two variants and to determine the quantitative characteristics of the process of comparing the lengths of vowels. The length of the interval between two adjacent vowels in a speech-like sequence, corresponding to a vowel in speech, was a feature for detection of the pause boundary in the signal. Pause perception is hardly dependent on the quality of the vowel. The quantitative characteristics of a system for auditory detection of pauses in the signal were found from the methods of conducting the experiment and of processing the results. The acoustic pause of silent explosive vowels is more easily perceived as a pause boundary than is a sonant in which there is no acoustic pause. Figures 3; references 5: 3 Russian, 2 Western.
[218-6521]

PRINCIPLES OF TEMPORAL PROCESSING OF SPECTRAL INFORMATION IN VOWEL PERCEPTION

Leningrad FIZIOLOGICHESKIY ZHURNAL SSSR IMENI I. M. SECHENOVA in Russian Vol 67, No 5, May 81 (manuscript received 7 Jul 80) pp 712-719

CHISTOVICH, L. A., OGORODNIKOVA, Ye. A. and CHIKHMAN, V. N., Laboratory of Speech Physiology, Laboratory of Speech Biophysics and Computer Center, Institute of Physiology imeni I. P. Pavlov, USSR Academy of Sciences, Leningrad

[Abstract] Sequences of two single-formant clicks with frequencies F1 and F2 were used as elementary variables of the range of stimuli in a vowel identification experiment. The phonetic similarity of these stimuli to single-formant stimuli with constant formant frequency equal to either F1 or F2 and to two-formant stimuli were found to calculate the phonetic distance between the stimuli. The hypothesis of integration for forgetting is proved when the auditory analog of the spectral envelope is separated in the auditory nerve. Figures 5; references 22: 11 Russian, 11 Western.

[218-6521]

NEW APPROACH TO DETERMINING THE PHONETIC SIMILARITY OF STIMULI AND CHECKING IT IN AN AUTOMATED EXPERIMENT

Leningrad FIZIOLOGICHESKIY ZHURNAL SSSR IMENI I. M. SECHENOVA in Russian Vol 67, No 5, May 81 (manuscript received 7 Jul 80) pp 704-710

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[Abstract] The theoretical bases for selecting the method of determining the similarity of stimuli as vowel phonemes were considered and the results of applying the method in an automated computer-run experiment were described with respect to investigating the perception of vowel-like clicks. Perception is investigated by determining the task faced by the test subject, indicating the variables to be recorded during the experiment and indicating the methods of processing the data. The same order of stimuli was detected by phonetic similarity which was determined previously by using the method of setting in vowels much more similar to natural stationary vowels. The method of estimating the phonemic similarity of stimuli by comparing the distribution of phoneme responses corresponding to these stimuli was sensitive and efficient. Figures 2; references 19: 11 Russian, 8 Western.

[218-6521]

DETECTING THE NONSIMULTANEITY THRESHOLD OF SWITCHING ON TONES IN A TWO-TONE SIGNAL

Leningrad FIZIOLOGICHESKIY ZHURNAL SSSR IMENI I. M. SECHENOVA in Russian Vol 67, No 5, May 81 (manuscript received 7 Jul 80) pp 696-703

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[Abstract] The dependence of the minimum time interval between initial tones in which the presence of initial nonuniformity in the stimulus or nonsimultaneity threshold was investigated as a function of the frequency position of the components, the time of their increase and the order of tracking the tones. The identification of the order of tracking the tones in two-tone signals was also investigated. The threshold was not dependent on the distance between tones by frequency in the middle frequency range of 250-4,870 Hz and is not dependent on the order of tracking the tones. The threshold increases and a sharply marked dependence of the threshold on the order of tracking the tones appears if the onset time of the tones is increased. The interval between the beginnings of the tones should considerably exceed the detection threshold of the nonsimultaneous appearance of tones to identify the order of tracking the tones. Figures 5; references 8: 5 Russian, 3 Western.
[218-6521]

UDC: 616.8-009.836-085.814.1

ACUPUNCTURE THERAPY AS A POSSIBLE MEANS OF DIFFERENTIATED CORRECTION OF NOCTURNAL SLEEP STRUCTURE

Moscow SOVETSKAYA MEDITSINA in Russian No 3, Mar 81 (manuscript received 14 Dec 79) pp 32-36

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[Abstract] This study was prompted by the reports of recent years that pharmacological agents (hypnotics, tranquilizers), which are widely used to treat sleep disorders of the agrypnia (insomnia) type, distort the structure of nocturnal sleep to some extent or other, and habituation occurs with some agents, referable to the barbiturate class. Acupuncture was used on 25 patients with the agrypnic syndrome attributable to psychogenic functional disease (neurosis), with average age of 43 years, 15 women and 10 men. One group (15 patients) received corporeal acupuncture

using three levels of treatment of active points and the second (10) received auricular acupuncture, the treatment consisting of two 12-15-treatment courses at 2-3 week interval, without use of other forms of therapy. Efficacy of treatment was evaluated on the basis of pre- and post-treatment clinical neurological, electroencephalographic, rheoencephalographic, MIL personality tests, and continuous polygraphic recording of nocturnal sleep parameters, which were analyzed according to the classification of Rechtschaffen and Kales. Both forms of acupuncture relieved emotional tension and attenuated nonspecific activation. It has a selective effect on both the controlled and controlling levels of the brain system responsible for organizing sleep and wakefulness, i.e., it alters the relationship between activating and somnogenic brain systems to favor the latter, so that it has a distinct influence on objective sleep disorders related to neurosis. Figures 1; references 11: 10 Russian, 1 Western.
[204-10,657]

UDC 612.821.6

STUDY OF REFLEX SYSTEMS UNDER ALTERNATIVE SELECTION CONDITIONS

Moscow BIOLOGICHESKIYE NAUKI in Russian No 4, Apr 81 (manuscript received 6 Jul 79)
pp 72-75

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[Abstract] The capability of rats to select an optimum path to reach food reinforcement was investigated under conditions that create the possibility of free selection. The experiments were conducted on 10 white male rats in an experimental chamber equipped with shelves with lamps above each of them and a feeder. A conditioned reflex system consisting of three sections and reinforced with food was developed in the rats. The rats were offered the opportunity to press on pedals while moving about the experimental chamber to obtain food. The rats were conditioned with a three-section chain of reflexes. The tactics used by the animals to achieve reinforcement were considered. It is assumed that the rats develop the capability to select the optimum path from those paths offered to reach food. Figures 3; references 1 Russian.
[211-6521]

DEPENDENCE OF BACKGROUND AND EVOKED ELECTRICAL ACTIVITY OF THE HUMAN BRAIN ON THE SIGNAL SIGNIFICANCE OF STIMULUS

Moscow BIOLOGICHESKIYE NAUKI in Russian No 4, Apr 81 (manuscript received 16 May 79)
pp 64-72

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[Abstract] A complex chain stimulus in the form of three-time presentation of a light flash emitted at constant 6-second intervals was used to study the characteristics of the effect of different phases of the conditioned stimulus. The background and evoked bioelectric activity of the occipital and sensory motor regions and the vertex were recorded according to the international tapping scheme in 47 test subjects. The ambiguity of the physiological processes occurring during different periods of the stimulus was established by using the discrete complex stimulus. The functional relationships between separate discrete stimuli were determined upon combination of them into an indifferent chain complex and the relationships were intensified upon reinforcement. The responses to the first and last stimuli are intensified and those to intermediate stimuli are attenuated with the result that the amplitude relationships of the visual evoked potentials of the occipital region and vertex zone become U-shaped. The background EEG, more marked by the moment of reinforcement shows variation after the stimulus. The dependence occurs with a range of light intervals of 4 to 8 seconds and with 3 to 5 stimuli given in series. The amplitudes of the evoked potentials to light flashes are determined by the time ratio of each of the flashes with reinforcement. Figures 4; references 17: 13 Russian, 4 Western.

RADIATION BIOLOGY

UDC 599:575.23

ROLE OF EXTREME ENVIRONMENTAL FACTORS IN THE RADIATION TOLERANCE OF MAMMALS

Moscow USPEKHI SOVREMENNOY BIOLOGII in Russian Vol 91, No 1, Jan-Feb 81 pp 90-98

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[Abstract] The radiation sensitivity of mammals was studied with regard to their nonspecific tolerance formed during evolution under the influence of different extreme environmental factors on the body. The effect of the increased radioactive background and the toxic agents not occurring previously on the animal world was investigated in their relationship to nature and man. Individual physiological adaptation to radioactive damage is reflected in stress reactions that mobilize the protective and regeneration systems of the body, leading to a temporary increase of resistance to radiation. Natural selection of animals occurs in regions with frequent extreme environmental factors in which a given species of mammals is strengthened by heredity when damaged by radiation exposure. By determining the tolerance of mammals to the effects of damaging factors, one can predict which species will be damaged to the greatest degree and which will undergo intensive mutation and adjustment to harmful factors. References 109: 88 Russian, 21 Western. [207-6521]

HYGIENIC ASPECTS OF LASER SAFETY

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 2, Feb 81
(manuscript received 2 Jan 80) pp 32-36

SHITSKOVA, A. P., ZAICHENKO, A. I., POL'SKIY, O. G., PAL'TSEV, Yu. P. and KARMOLIN, A. L., Institute of Hygiene imeni F. F. Erisman, USSR Ministry of Health. Moscow

[Abstract] The basis for and problems associated with formulating hygienic standards for laser safety are discussed. Standardization of laser irradiation has been based on its harmful effect on eyes or skin and on functional changes in eyes or other organs and tissues. One problem has been that values used for the threshold of harmful action differ depending on the methods used to determine physical changes, exposure time, wavelength and type of laser. Contradictory data have been presented even for the simple evaluation of the heat threshold. The broad range of wavelengths and parameters of laser irradiation and the variety of induced biological effects also make it difficult to substantiate standards since verification of data requires a very long time. Experimental and clinical studies on humans and animals have shown that laser irradiation, at levels significantly lower than the retinal damage heat thresholds, affects the B and T systems, blood biochemical values (ammonia, albumins, globulins) and the nervous and cardiovascular systems. Despite these problems, some basic principles for standardization are recommended: standardize laser irradiation in the range of 100-315 nm and 1400-10⁶ nm according to its harmful effect on the cornea and in the range of 315-400 nm according to its harmful effect on the lens; standardize laser irradiation in the range of 400-1400 nm with an exposure time between 10⁻⁶ and 10 s according to its effect on the retina and between 10⁻⁹ and 10⁻⁶ s according to its heat effect and effect on retinal melanin; standardize laser irradiation in the range of 700-1400 nm with an exposure time exceeding 10 s according to the heat effect on the retina; standardize laser irradiation in the range of 400-750 nm with an exposure time from 10 to 10² s according to the heat and photochemical effect on the retina and above 10² s according to the effect on the retina and other body organs and systems.

References 10: 3 Russian, 7 Western.

[222-9307]

HUMAN FACTORS

UDC 613.693:612.766.1:612.821.34-057:358.431

INDIVIDUAL PSYCHOLOGICAL CHARACTERISTICS OF PILOTS MAKING MISTAKES

Moscow VOYENNO-MEDITSINSKIY ZHURNAL in Russian No 4, Apr 81 pp 54-56

[Article by Candidate of Psychological Sciences N. F. Luk'yanova and Ye. N. Lobova]

[Text] The hypothesis exists that the individual psychological features of a pilot's personality are sometimes the cause of mistakes in the air, or even of accidents. An attempt to study, by means of special methods, the mental processes occurring in pilots making mistakes in the air has confirmed this relationship in some cases. However, the results cannot be said to be sufficiently reliable. The reason for this is that on one hand the indicators of memory, psychomotor functions, and attention exhibit rather significant scatter when measured by existing methods, and on the other hand they yield to correction through training. Thus the need arises for finding psychological correlates, for the causes of mistakes, in the domain of the stabler personality characteristics of the given category of pilots; the results would make it possible to recommend methods for revealing accident-prone persons.

The goal of this study was to reveal some features of the personality of pilots making mistakes in the air. We studied a group of young pilots (with a flying career of 1-2 years) who had made mistakes in the air, and students admitted to the hospital due to low aptitude in flying. In addition we examined persons who washed out of flight school.

The integrated psychological study included: an interview having the purpose of detailed penetration into the essence of the work, personal, and family situations of the subject; analysis of medical documents (disease history, medical log, work performance report, and medical reports revealing presence of illness, difficulties in psychosocial adaptation, and so on); experimental psychological methods, to include study of the basic mental processes and properties of the personality.

We assessed the quality of perception of three-dimensional relationships, the capability for quickly memorizing and recalling conceptual material, the volume, persistence, and productivity of memory, the capability for distributing and switching attention, and the stability of attention.

Features of the character and temperament were studied with the help of the standardized personality analysis method (SPAM), the thematic apperception test (Khekkhauzen's variant of the TAT), and the 16-factor personality inventory (16 FPI). We described these methods in detail earlier in other works (N. V. Luk'yanova et al., 1977). All

methods were standardized with the help of a large group of flying personnel, which permitted us to acquire new normative data. The individual psychological features of 72 percent of the subjects may, in our opinion, be the cause of unreliability in flight.

Observations demonstrating that study of the personality features of pilots may help to some extent to explain mistakes they made in the air are presented below.

Pilot M., born 1953, survived a number of near-accidents within a short period of time. His work performance report indicates that he loses self-control when faced by a complex situation. Long intervals between flying (up to 10 days) have a significant influence on the quality with which he completes his flying assignments. Investigation of his basic mental processes revealed a reduced capacity for distributing and switching attention, low attention stability, and somewhat reduced memory. The results of the SPAM and 16 FPI personality tests were significant; however, the pilot did exhibit a tendency to compensate for shortcomings in his character. The personality profile for pilot M. revealed by the SPAM is shown in the figure below by a solid line.

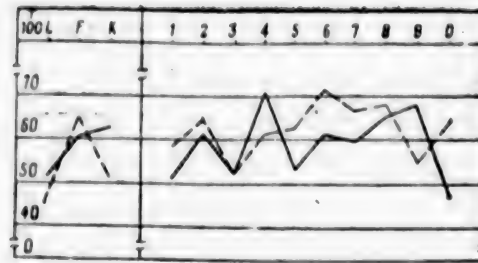
The subject is impulsive, quarrelsome, and unsociable, and he exhibits pronounced difficulties in social adaptation. In situations requiring observance of conventional norms, his behavior is sometimes emotionally inadequate, as manifested by excessive reactions brought on by insignificant causes. In extreme conditions, these traits of character may produce emotions that disorganize activity, while weakening of control over emotions may cause a significant decline in the quality of activity.

Pilot K., born 1945, experienced difficulties during flight training. He makes mistakes while flying at the present time. As an example three times he tried to land with his landing gear up after reporting that it was down; after which he was sent to the hospital for examination.

His work performance report and medical report indicate excessive tension in flight, irritability, introversion, and pathological reaction to critical remarks. Analysis of data obtained after investigation of his basic mental processes revealed difficulties in completing assignments against the clock. He exhibits an uncritical attitude toward his own mistakes, his rate of mental reaction is slow, the number of mistakes he makes grows when attention switching becomes necessary, it is difficult for him to alter his mode of action, and he displays rigidity.

The subject's SPAM personality profile is shown in the figure by the broken line. Reclusiveness, a propensity for conflicts, suspiciousness, pronounced stubbornness, and the desire to always find justification for his acts are his principal character traits. The pilot exhibits inertia in his experiences, he is resistant to change, and he switches his attention with difficulty, "getting stuck" in conflict situations and problems, ones which appear extremely important to him but which are usually not so in truth.

In this case we can hypothesize that rigidity manifested as difficulties in switching attention or changing the stereotype of activity was precisely the cause of frequent mistakes.



SPAM profiles for pilots M. and K.. Symbols: L, F, K--test significance scales; 1--degree of subject's fixation on his health; 2--tendency toward anxiety, control over emotions; 3--emotional lability, social pliability, conformity; 4--propensity for risk-taking, impulsiveness, high aspirations; 5--masculine and feminine traits of character; orientation of sexual interests; 6--rigidity of judgments, "stiffness" of attitudes, persistence, stubbornness; 7--anxiety, psychasthenic traits; 8--uniqueness of thinking and perception, intuition; 9--level of activity and optimism; 0--social introversion-extraversion.

It would be important to acquire information indicating presence of personality features unsuited to flight training early, during psychological selection of applicants. It is true, however, that the methods for studying the basic mental processes do not always reveal qualities of character and behavior which would be contraindications to flight training.

Properly organized training and indoctrination based on promptly acquired information on the individual psychological features of students would be an aid in correcting unfavorable personality features. But correction of accentuated personalities ("extreme variants of a normal character" according to G. K. Ushakov, 1973) is extremely difficult, and the results are not long-lasting, since difficulties of a personal and, all the more so, a professional nature provoke arising of unfavorable psychological qualities in behavior.

The following personality features were revealed among young pilots admitted to the hospital with unfavorable flight characteristics.

The SPAM profiles were typified by high indicators for scales 4 and 9 (72-78 T), indicating emotional instability, inadequate optimism and, in combination with the low indicators for scale 2, a reduced feeling of anxiety is connected with non-standard social tendencies. High indicators for scales 8 and 0 (75-80 T) indicate poor social adaptation, high indicators for scales 9 and 7 (70-75 T) indicate disinhibition, insufficient patience, and high anxiety--that is, features resulting in chaotic behavior in extreme conditions; high indicators for scale 7 (77-80 T) indicate low resistance to interference. The motivation intensity index (determined by the TAT) is very low for these pilots--7-8 points; lack of confidence and the desire to avoid failure in activity dominate their behavior.

High indicators were recorded among these subjects for factor M of the 16 FPI, indicating a significant tendency toward fantasizing and dreaming, easy distraction, and for factor E (excessive independence). Low indicators were obtained for factors O, Q4 and G, indicating excessive complacency and insufficient persistence and motivation.

The research showed that pilots making mistakes in the air possess typical features which may be interpreted, in all probability, as preconditions of flying accidents. This conclusion requires further testing. The noted relationship must be deeply studied in application to different categories of pilots and different kinds of mistakes, in relation to the frequency and conditions of their arising among concrete pilots, and so on. But there can be no doubt that this approach to studying occupational suitability and reliability is extremely promising. Use of special methods is a prerequisite for revealing individuals having individual psychological qualities that are contraindicated to the pilot's profession. These methods may definitely be employed by either psychologists or flight surgeons, following the appropriate training.

The recommendations made by a flight surgeon to commanders and instructor pilots on the basis of a study of the personality features of students and pilots may be utilized for many purposes, the main ones of which are: First, commanders may break in flight crews more quickly with the help of these recommendations. Second, the flight surgeon can work on persons with unfavorable individual psychological features, using the methods of psychosomatic control--autogenic training for example. Presence of qualities unfavorable to flight training should serve as grounds for closer attention to preparation of these individuals for flying and, when necessary, for limiting their occupational activity.

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PROBLEM OF FATIGUE IN SEAMEN

Moscow VOYENNO-MEDITSINSKIY ZHURNAL in Russian No 4, Apr 81 pp 56-57

[Article by Professor, Colonel of Medical Services A. S. Solodkov]

[Text] The reason fatigue is significant from a theoretical and a practical standpoint is that knowledge of its laws permits us to develop ways to maintain fitness for work and scientifically organized labor in such a way that the individual's working conditions would be consistent with his psychophysiological possibilities.

There are now more than 50 definitions of fatigue, and a number of theories on its arising and development; this is an indication of our insufficient knowledge of its mechanisms. From a physiological point of view fatigue is a state of the body, elicited by mental or physical work, in which fitness for work temporarily decreases, functions undergo alteration, and a subjective sensation of being tired arises (A. S. Solodkov, 1978).

The principal objective sign of fatigue in an individual is his reduced efficiency. However, this is not always a manifestation of fatigue, and it may sometimes be observed in response to an individual's presence in unusual conditions (high air temperature and humidity, reduced partial pressure of oxygen in inspired air, hypokinesia, etc.). It is a symptom of fatigue only when it arises following physical or mental work.

Change in body functions in the course of work is an important criterion of fatigue. In this case the functional changes may vary depending on the degree of tiring. In the initial stage, clinical physiological and psychophysiological indicators are distinguished by unstable changes of varying direction; as a rule, however, their fluctuations do not go beyond physiological norms. In the presence of pronounced fatigue, and especially overwork, we observe significant deterioration of all functional indicators in the same direction, and a concurrent decrease in the level of occupational activity.

Fatigue is typified also by a subjective symptom--tiredness, which manifests itself as heaviness of the head and limbs, general weakness, sluggishness, and indisposition; it becomes difficult to do a job, and so on. In A. A. Ukhtomskiy's opinion (1952) tiredness is not only a subjective sign of developing fatigue, but is also an indicator of physicochemical changes in the body. When the individual begins to feel tired, he reduces the pace of his work, or he abandons it altogether. Thus he prevents functional exhaustion of cerebrocortical cells and insures a possibility for

quick recovery of efficiency. Special studies established that the subjective state of seagoing specialists has great informative significance to determining changes in their fitness for work and the degree of their tiring.

The main factor eliciting fatigue is the load imposed upon afferent systems during physical or mental work. The dependence between the size of the load and the degree of tiring is almost always linear--that is, the higher the load, the earlier fatigue arises and the more pronounced it is. Moreover the intensity, periodicity, and static or dynamic nature of the load also influence development of fatigue.

In addition to the principal factor (work load) eliciting fatigue, there are a number of additional or contributing factors. On their own, they do not lead to the development of fatigue; however, they promote its earlier arising and greater expression. They include an unfavorable environment, change in the work-rest schedule, hypokinesia, sensory deprivation, disturbance of accustomed diurnal biorhythms, psychosocial factors, and the nature of mutual relationships existing between members of a collective. The time of onset and the degree of expression of fatigue also depend on the initial functional state of the seaman's body, his physical fitness, general and special training, experience, and so on.

In my opinion we must study the essence of fatigue in two basic directions. The first presupposes careful consideration of all signs of fatigue and thorough investigation of the manifestations of fatigue--that is, assessment of the direct indicators of efficiency (the amount and quality of work).

The second and perhaps more important direction involves analysis of the indirect indicators of efficiency (psychophysiological, clinical-physiological, and biochemical aspects of this process). It should be kept in mind in this case that changes in indirect indicators occur sooner than changes in direct indicators. As an example during lengthy cruises, the indirect indicators of seaman efficiency worsen 2 to 3 weeks before the direct indicators do. This may be accounted for when forecasting the fitness for work and the degree of tiring of seamen in a subsequent period of the cruise. Moreover analysis of data describing the state of body functions permits us to examine, more fully and precisely (in comparison with evaluating the direct indicators) the mechanisms of adaptation and tiring of seagoing specialists, and determine scientifically grounded measures aimed at preserving and restoring the efficiency of seamen.

An evaluation of an individual's fitness for work and diagnosis of fatigue would be sufficiently complete if we first systematically study the subjective state and the direct and indirect indicators of the efficiency of seamen over the entire cruising period. By continuously monitoring the way seamen felt, the dynamics of body functions, and the level of occupational activity, we were able to reveal the following phases in the changes experienced by such indicators recorded for seagoing specialists during lengthy cruises: 1) improvement of the individual's opinion of his health, and of the direct and indirect indicators of fitness for work in the initial period; 2) stabilization of these indicators; 3) appearance of complaints, and change in body functions in different directions, in the presence of stable direct indicators; 4) presence of a sensation of being tired before start of work, and unidirectional deterioration of indirect indicators, accompanied by a decline in the level of occupational activity.

Information describing the cyclicity of the efficiency and degree of tiring of seamen, information from opinions of their own health, data describing body functions, and indicators of occupational activity may serve as grounds for recommending additional rest for some categories of seagoing specialists.

The principles of diagnosing fatigue and overwork have been extensively discussed in recent years. An analysis of published data and information from my own research led me to the conclusion that fatigue is a normal physiological reaction to work, and overwork must be interpreted as a pathological state leading to progressive decline of occupational efficiency. Therefore the principal method for diagnosing fatigue must be to determine the correlation between changes in body functions and the dynamics of occupational activity. In the opinion of F. P. Kosmolinskiy and Ye. A. Derevyanko (1962), fatigue develops in periods of complete and unstable compensation of efficiency, and it progresses to a state of overwork in response to progressive decline of efficiency.

When the individual tires, the indicators of his body functions and his occupational activity decline insignificantly. Unidirectional deterioration of the indirect indicators of efficiency, a sharp decline in the level of occupational activity, and arisal of gross mistakes in work are felt to be the most important symptoms of overwork.

Disturbance of the occupational activity of seamen is often the first sign causing a physician to suggest overwork. These disturbances affect mainly the quality of the work: The number of systematic mistakes in work grows, errors which had not been made previously begin to arise, and the rate of work-related motions slows down. Even the most insignificant overwork of seagoing specialists is impermissible when they are assimilating new, more-complex equipment, since mistakes in working with such equipment may lead to accidents.

Overwork is a state in relation to which ordinary rest is insufficient to restore fitness for work, and in which objective and subjective residual phenomena associated with previous activity persist in the human body at the beginning of the next work cycle. Not enough rest, improper rest, or an excessive work load may be the cause of overwork. Thus the state of overwork always arises when the work-rest schedule is disturbed, and it is typified mainly by a sensation of tiredness before work. It leads to a sharp worsening of quantitative and qualitative indicators of efficiency, and to arisal of gross mistakes in the performance of occupational responsibilities.

In labor physiology, the duration and intensity of activity are interpreted as the principal factors of the arisal and development of fatigue. Therefore optimization of the work-rest schedule of seamen would be an important preventive measure, one which should be based on a principal well known in labor hygiene--time has a way of protecting against various sorts of unfavorable influences. The length of time having a "protective" influence against development of pronounced fatigue and overwork depends on the nature of the individual's behavior in the time of rest between work cycles, which may be active and passive. In this connection the acceptable way to solve this problem in relation to seagoing specialists is, on one hand, to ensure good-quality, continuous sleep of sufficient duration and, on the other hand, to switch the individual from one form of activity to another in accordance with the existing daily routine (active rest).

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RESULTS WERE IMPROVED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 5, May 81 p 17

[Article by Lieutenant Colonel in the Medical Service A. Pleshan' and Lieutenant Colonel in the Medical Service E. Kozlovskiy, candidate of medical sciences]

[Text] The activities of man and his nervous emotional stresses are closely related. If a great deal of nervous emotional stress is experienced during training in a flight simulator, then the pilot has not learned the flight assignment adequately. Hence, based on the pilot's level of nervous emotional stress during flight simulator training, the level of his flight preparedness, the degree of mastery of one or another elements of flight, and in the final analysis, his readiness for execution of the assignment in the air can be judged.

For our investigation, we used the apparatus "Physiolog" to define the nervous emotional stress of pilots by monitoring changes in physiological parameters: frequency of pulse, respiration and minute respiratory volume. Clips to monitor cardiac contraction frequency (CCF) were attached to the ear lobe. Monitors for respiratory frequency (RF) and minute respiratory volume (MRV) were attached to oxygen masks of the KM-32 type. During training sessions, the instructor controlled the nature of the piloting course, and the physician monitored the values for CCF, RF and MRV continually at each stage of flight. After the flight, the data obtained were tabulated and analyzed, and conclusions were drawn regarding the quality of piloting techniques and the amount of nervous emotional stress experienced. Additional training was recommended for those pilots who demonstrated poor piloting technique and who experienced a high degree of stress.

Eleven young pilots participated in the study. To obtain significant and long-lasting results from training sessions in the simulator, we found it necessary first to determine the level of pilot flight preparedness and degree of nervous emotional stress.

Each pilot completed 10 circling flights per each method used. The circling flight was divided into six hypothetical stages (operations): ascent, first turn, horizontal flight, second turn, approach to landing and passage through radar.

At each stage, the director of the flight (pilot-instructor) recorded the maximum variation in speed, height, course, bank, KUR [directional angle of radar] and verticle speed. The physician determined the level of nervous emotional stress.

Piloting technique was evaluated not by the instructor but by the physician, using a special method. Based on data obtained, assessment of performance was determined by a tetrapoint system (2, 3, 4, 5).

Because the pilots were evaluated at all 6 stages, after 1 flight, the pilot could accumulate a maximum of 30 points and a minimum of 12. After 10 flights, 300 and 120 points could be earned, respectively. Dividing the total sum of points received by the number of evaluations performed (60), we obtained an average rating for all recorded parameters. For example, if after 10 flights, the pilot accumulated 260 points for his piloting technique, then his average rating (260:60) was equal to 4.33 points. As a result, five pilots completed flights with an average score of 4 points or more, with a minimum score for piloting of 3.15 points and a rating for stress levels of 3.46.

Based on these data, we concluded that the majority of pilots had an adequately high level of flight preparation. The findings of the physician were in full agreement with those of the instructor.

Using the total sum of points and the average rating, the physician separated the pilots into groups according to their level of advancement. A similar grouping of instructors was made but was based on actual flight performance rather than on training. For greater objectivity, data gathered by the physician on the instructors' performance were not reported. However, grades for flight preparation based on data taken during training sessions in the flight simulator and during actual flights correlated well. In other words, a high degree of correlation was found between indices for preparation of pilots in the flight simulator and in actual flight conditions. This finding suggests that a method of evaluation based on data concerning pre-flight training preparation can be used to predict pilot performance during flight.

However, further, more detailed analysis of the activity of pilots in the flight simulator revealed somewhat unexpected results. One pilot completed 10 flights with an average score of 4.08 points for piloting techniques and 4.19 points for nervous emotional stress. According to all criteria, he was well prepared for flight. The instructor considered him to be one of the best pilots among the various groups. Based on these results, it appeared that the officer did not require additional work in the flight simulator. However, analysis of his piloting technique during the various operations showed that for the stage "passage through radar," he earned an average score of 2.9 points and after 10 flights received six 2.0 scores. Results were evaluated in a similar fashion for the other pilots. We found that while all pilots, even the well prepared ones, had an average total score of 4 points or more, certain elements of their flight performance were completed with poorer techniques. Therefore, we decided to conduct additional training in the flight simulator.

We developed individual training programs in which basic attention was devoted to those elements of flight in which the pilot showed deficiencies in technique. First, the previous assignment was reviewed thoroughly with the pilot. Then, the instructor analyzed his mistakes, determined their possible causes and noted ways to eliminate them. Finally, the pilot carried out one or two transport flights after which he executed circling flights of the type assigned in the first series.

As a result of these training sessions, all pilots showed marked improvement in the quality of piloting and the level of nervous emotional stress was reduced. Consequently, their grades were improved both for the whole flight and for individual elements of it.

The investigation also showed that in order to advance to a specified level of expertise (that is, a grade of "good" for all parameters), well prepared pilots required 5-7 flights in the simulator and less prepared ones, 10-17 flights.

We conclude: Participation of physicians in flight training programs conducted in piloted and complex flight simulators allows a more in depth study of the psycho-physiological characteristics of the flight staff, improves the quality of training and increases the effectiveness of pilot preparation for execution of the flight task; the method for evaluating piloting skills and levels of nervous emotional stress during training sessions in a flight simulator makes it possible for less trained pilots to manage individual training programs and thus, to improve their flight skills.

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ERGONOMIC DESIGN OF MACHINE TOOLS

Moscow MASHINOSTROITEL' in Russian No 5, May 81 pp 20-21

SHUL'SKIY, P. M., candidate of technical sciences

[Abstract] Three methods were examined for solving the problem of mass interaction of man and machine that include professional selection to select the human operator with characteristics as close as possible to those required, improvement of existing hardware to match its characteristics to human capabilities and design of new articles on the basis of human characteristics. Most machine tools are modernized only by changing individual assemblies and improving them in the engineering or ergonomic sense. The new approach to designing machine tools is discussed from the viewpoint of taking into account the human factor and ergonomics. The different steps involved in design of machine tools are discussed from the aspect of the human factor. The different State Standards that govern the ergonomic requirements, terms and definitions concerning general ergonomic indicators, the operator's position and its individual components, the working environment and work safety are listed and it is suggested that new standards be compiled for the foot control members and ergonomic indicators for estimating the repairability of machine tools. It is suggested that present and future standards be used during preliminary design to determine the locations of foot and hand control members, the extent and arrangement of the machining zone and the arrangement of information display devices. Various handbooks and methodical and information materials used in machine-tool design are listed. References 9 Russian.

[210-6521]

PSYCHOPHYSIOLOGICAL SCREENING OF MOTOR VEHICLE DRIVERS

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 4, Apr 81
(manuscript received 27 May 80) pp 13-16

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[Abstract] In view of the high demands made with regard to reliability of drivers in the system of driver--motor vehicle--traffic environment, the large size of this occupational group, level, rate and prospects of development of motor vehicles and absence of methods for psychophysiological screening for this profession that would blend a high degree of prognostic value with feasibility of broad use in driving schools, an effort was made to develop a method of determining the psychophysiological suitability of individuals for the driving profession, and it consisted of several stages: defining the psychophysiological traits that affect fitness for this occupation; choice of a set of methods and the parameters of important traits; gathering experimental data with the selected methods on a group of driving school graduates and follow-up of their subsequent work performance; minimizing the parameters describing drivers' psychophysiological status to the level that is sufficient and necessary to reliably separate drivers into those who are fit and unfit for this occupation; composition of a rule that would yield an integral rating of psychophysiological fitness of a subject for this occupation. Measurement of reactions to a moving object, resistance to monotony (simple oculomotor reaction time to 240 photic stimuli delivered at 5-s intervals), retrieval of numbers on a black and red table, capacity for prediction, EKG and galvanic skin response were found to be the minimal amount of tests required, and they took no more than 2 h per driver. Testing of 450 driving school students in Gor'kiy and evaluation of predicted and real performance of driving work over a period of 1 year showed the value of the proposed methodology, which could save about 140,000 rubles/1000 driving students. References 13 Russian.

[200-A-10,657]

PSYCHOTROPIC PROPERTIES OF THE TETRAPEPTIDE, TAFTSIN, AND ITS EFFECTS ON TRAINING

Moscow FARMAKOLOGIYA I TOKSIKOLOGIYA in Russian Vol 44, No 3, May-Jun 81
(manuscript received 3 Apr 80) pp 275-279

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[Abstract] Taftsin (L-threonyl-L-lysyl-L-proline-L-arginine) was tested on male mice and rats (20, 50, 100, 150 and 300 $\mu\text{g/kg}$ intraperitoneally and intracerebrally) to study its effects on behavioral reactions of mice, orienting motor activity (horizontal and vertical movements; learning to go through a T-shaped maze in rats, with food reinforcement--70 animals), as well as its influence on the effects of hexenal, apomorphine, phenamine, L-dopa, arecoline, nicotine, reserpine, ethaperazine injected intraperitoneally. Its effects on bioelectrical activity were tested on 10 rats (bipolar electrodes implanted in the head of the caudate nucleus, lateral hippocampus, mesencephalic reticular formation and cortex recorded on 8-channel electroencephalograph, Taftsin dosage 10 and 20 μg). After both routes of administration Taftsin had a stimulating effect on animals' spontaneous activity, appearance of stereotype movements, jumps and exploratory behavior, which lasted for an average of 30 min and followed by a mild sedative effect (mean of 30 min). Taftsin enhanced the effect of phenamine but attenuated that of apomorphine and L-dopa, as well as the hypothermic effect of reserpine, without changing the cataleptogenic effect of ethaperazine. There was some change in behavior of animals in the T-shaped maze under the influence of only the largest dose of Taftsin (300 $\mu\text{g/kg}$), with decline of latency period and reaction time, suggesting that this was due to the stimulating effect of this agent. Bioelectrical activity of the rat brain changed after intraperitoneal injection of 50-300 $\mu\text{g/kg}$ Taftsin, presenting two phases and more marked with the largest dosage, the first phase being stimulation and the second, mild sedation. The stimulating effect is blocked by phentolamine, but not altered by propranolol or trifluazolin [stelazine].
References 16: 5 Russian, 11 Western.

[203-10,657]

PROBLEMS OF MENTAL HYGIENE AND PREVENTIVE PSYCHIATRY IN THE PRACTICE OF THE TROOP PHYSICIAN

Moscow VOYENNO-MEDITSINSKIY ZHURNAL in Russian No 4, Apr 81 pp 66-68

[Article by Docent, Colonel of Medical Service A. V. Kudinov

[Text] The military medical service actively participates in troop moral-political and psychological training in close association with the activities of the command, political workers, and all officer-indoctrinators. But at the same time we need to distinguish between the extent to which the military-medical service participates in measures associated with moral-psychological training in general, and in individual measures for which it is specifically responsible.

In the first case the activity of the medical service is basically consultative in nature, having to do with developing recommendations on sensible distribution of physical and mental loads, raising the battleworthiness and efficiency of the personnel, and utilizing servicemen with a consideration for their nervous and mental health, and their personality features. Moreover the physician staff takes part in occupational selection of specialists, in analysis of work-rest schedules, in organization of food services, and so on.

In the second case the principal content of the work of the medical service may be described as medical education, preventive psychiatry and mental hygiene, analysis of the young soldier's adaptation to the conditions of military service, investigation of his adaptive reactions, and prevention of psychogenic disturbances and excessive emotional stress. In addition the unit physicians actively reveal persons with mildly pronounced nervous system disorders with the purpose of early recognition of nervous and mental diseases, they keep such individuals under dynamic observation, and they ensure prompt dismissal of persons unsuited to military service from the army. In this article we will dwell basically on preventive psychiatry and mental hygiene.

Significant to preventive psychiatry is early revelation and registration of persons with nervous and mental disorders, and implementation of therapeutic measures in relation to such servicemen. In this case the medical service must interact with subunit commanders and political workers, who have the possibility for observing their subordinates in the course of daily communication with them.

Measures aimed at revealing individuals with nervous and mental pathology (with borderline states) are implemented from the moment they arrive in the unit, and they continue on until the soldiers are retired into the reserves. During the time of

medical examinations, unit physicians reveal military servicemen stating complaints of a neurotic nature and having cranial injuries and infectious and other diseases in their medical histories. When assessing the health of such persons, they mandatorily consider information from commanders on their behavior.

In the first months of service, special attention is turned to preventing adaptive disturbances in young soldiers, associated with breaking a developed stereotype, and with change in habitual working and personal conditions. Usually such disturbances are the consequence of insufficient psychological preparation of the individual for military service, and they proceed in the form of asthenic reactions. In most cases adaptive neuroses arise in servicemen having psychopathic traits of character, and in ones who had previously suffered internal cranial injuries.

Servicemen with unstable minds are registered for observation. The tactics the physician may take in relation to them may vary depending on the nature of the mental disorders. Persons who had neurotic reactions and brain injury in their medical histories or who fall behind in combat training are offered consultation by a psychoneurologist (neuropathologist); they are examined carefully when necessary, and in some cases they are certified by a military medical commission. In the overwhelming majority of cases, such persons are deemed suitable for noncombatant service, but they do require assistance in job placement. On the physician's recommendation, they may be transferred to another subunit or released from some types of work. Medicinal therapy may be prescribed. Servicemen prone to fighting and to engaging in incorrect forms of behavior, and showing signs of heightened irritability are subjected to individual indoctrination work in the subunit.

Prevention of excessive nervous and mental stress, which is believed to be a mechanism by which the body adapts to new living conditions, has important significance to the practice of a troop physician. When an individual experiences such stress his pulse and respiration rate rise, arterial pressure increases, metabolism undergoes alteration, and so on. When servicemen not psychologically adapted to lengthy and significant mental and physical loads and when persons with unbalanced inhibition and arousal (with a weak type of nervous system) are subjected to such loads, they develop excessive forms of mental stress that lead to arisal of inadequate reactions.

It should be kept in mind that adaptation would not be optimum if emotional loads are not imposed upon the nervous system daily. Therefore prevention of excessive mental stress should not mean creating "hothouse" conditions for the servicemen. What is needed is a sensible system of training which would prepare soldiers to handle high mental and physical loads. Such adaptation can also be assisted by indoctrination work aimed at creating a certain psychological predisposition for enduring the burdens of military servicemen in the personnel.

The medical service's efforts in mental hygiene and preventive psychiatry would be unimaginable without the constant assistance of commanders and political workers. Special lessons are conducted to train servicemen in the issues of mental hygiene and preventive psychiatry. Unit physicians acquaint officers, warrant officers, and sergeants with the basic features of the physiological adaptive mechanisms of the personnel, and they explain the role of the psychological climate in the collective and of a sensible work-rest schedule in maintenance of mental health, and so on.

Mental hygiene measures additionally include publicity on the achievements of Soviet medicine in prevention and treatment of various diseases and combat pathology. The personnel must be regularly informed about radioprotective substances preventing development of radiation sickness or weakening its course, about sufficiently effective complex-forming substances which promote elimination of radioactive substances from the body, about the medical service's possession of highly effective war gas antidotes and effective polyvalent vaccines against the chance of the enemy's use of chemical and bacteriological weapons, and so on. The psychological influence of such information is extremely great, since it relieves the fear servicemen may have that radiation sickness and injury by war gases and bacterial agents is unavoidable, and that the outcome of such injury is fatal.

Servicemen must also be persuaded of the high effectiveness of the initial medical aid that may be provided as self-aid and mutual aid when combat injuries do occur. It should be emphasized in every military medical training lesson that if the enemy should use mass destruction weapons, resulting in instantaneous arrival of a considerable number of medical casualties, the significance of self-aid and mutual aid would grow significantly. This is true because the health and sometimes the life of the casualty depends on how competently and quickly this initial medical aid is rendered. On this basis, the medical personnel teach the servicemen the first aid techniques, and nurture the volitional qualities and self confidence that they would need.

Development of faith in the adequate reliability of personal and collective protective resources is an effective means of psychological preparation of the troops. Presence of effective therapeutic and preventive drugs in the personal medical kits of the servicemen, the availability of individual dressing and decontamination kits, and use of all-arms protective overalls are all factors which military physicians must utilize in their psychological preparation of the soldiers.

One of the tasks of the medical service is to teach the personnel to competently use their individual resources of medical protection, and to make their first aid actions automatic. It would be suitable to test the personnel on military-medical training standards during platoon and company tactical exercises; a real combat situation should be simulated at such time. For example searching for simulated casualties while wearing personal protective resources, the associated difficulties of rendering self- and mutual aid, removing casualties from simulated centers of mass destruction, and overheating of the body require not only great physical but also volitional effort and moral exertion, which promote formation of the necessary psychological predisposition of the soldiers.

A soldier going to battle is not indifferent to what he can expect if he gets wounded. His confidence that everything possible will be done to save his life and that there is enough manpower and equipment to do so places him in a psychological mood that would ensure high-quality fulfillment of his mission. Therefore even in peacetime, we must acquaint servicemen with the humanitarian principles of the Soviet therapeutic and evacuation system, and with the greater possibilities the medical service has for conveying casualties from the battlefield to therapeutic institutions, and rendering various forms of medical care.

All forms of medical education must be used to supplement the medical knowledge of the personnel--lectures, discussions, the press, visual-aid agitation and popular

scientific films, all of which may directly or indirectly serve the goals of troop moral-psychological training.

Certain unique features of the medical service's effort in psychological training of officers should be noted. The main objective here is to prepare officers to organize initial medical care and to conduct rescue operations in centers of mass casualties prior to the arrival of detachments which would take charge of the recovery effort following the enemy's use of a mass destruction weapon. Therefore the most highly qualified physicians must conduct the military medical training lessons and medical education measures for officers.

Participation of the medical service in troop moral-psychological training is one of the aspects of the medical service's extensive activities, and it deserves the most persistent attention. It should be emphasized once again that such a broad range of tasks may be completed successfully only through the joint efforts of commanders, political workers, and military physicians. Such work must be based on the data of modern science, and particularly psychology--general, military, social, and medical.

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MILITARY HOSPITAL HOLDS PHYSICIAN CONFERENCE

Moscow VOYENNO-MEDITSINSKIY ZHURNAL in Russian No 4, Apr 81 pp 79-80

[Article by Candidate of Medical Sciences, Colonel of Medical Service Yu. A. Maksimov and Colonel of Medical Service A. M. Perepelkin: "The 13th Scientific-Practical Conference of Physicians of the Central Military Hospital of Internal Troops, USSR Ministry of Internal Affairs"]

[Text] In January 1981 the Central Military Hospital of Internal Troops of the USSR Ministry of Internal Affairs held a scientific-practical physician conference devoted to the pressing problems of military medicine. It was attended by Professor, Major General of Medical Service V. G. Borisov, chief surgeon of the GVKG [not further identified] imeni N. N. Burdenko, Professor, Major General of Medical Service M. V. Shelyakhovskiy, division director of the Central Scientific Research Institute of Traumatology and Orthopedics imeni N. N. Priorov, Professor O. V. Oganesyan, and other specialists.

In his introductory remarks, hospital chief Colonel of Medical Service A. M. Perepelkin noted that qualified and specialized medical care enjoyed further development in the hospital during the 10th Five-Year Plan, and a large quantity of modern patient analysis and treatment techniques were introduced. This made it possible to significantly raise the effectiveness of therapy and diagnosis, and to improve all indicators of the work. The hospital has now become the methodological center for therapeutic institutions of the internal troops and the troop level of the medical service, which makes it possible to implement therapeutic and preventive measures in the units on a higher level, and to constantly improve the occupational proficiency of medical personnel.

Candidate of Medical Sciences, Colonel of Medical Service V. I. Yegorov, a prominent surgeon at the hospital, emphasized in his report "Organization of Surgical Care in the Hospital and the Prospects of Its Development" that owing to continual introduction of the latest achievements of medical science, improvement of surgeon training, and a better work style, the number of lethal outcomes was reduced to 0.2 percent and the number of postoperative complications was reduced to 1.2 percent, to include suppurative complications to 0.8 percent. In particular there was not a single lethal outcome in 3,100 appendectomies performed in the last 10 years. High results were achieved in the treatment of patients with acute cholecystitis, with perforated gastric and duodenal ulcers, with strangulated hernias, and with intestinal blockages.

Colonel of Medical Service Yu. P. Trusevich and his coauthors presented information on peacetime gunshot wounds. In the opinion of the authors the success of treatment depends on exhaustive primary surgical processing of the wound, with the use of adequate drainage and of antibacterial agents having a broad spectrum of action. Captain of Medical Service B. A. Khayrulin showed in his report that the results of surgical treatment of abdominal and thoraco-abdominal wounds depend on the amount of time before qualified care is provided, and on prompt replenishment of lost blood (reinfusion during surgery totaling from 100 to 3,000 ml).

Candidate of Medical Sciences Colonel of Medical Service Yu. S. Kulikov and Major of Medical Service R. F. Tagirov generalized the results of 10 years of experimental and clinical study of dioksidin and khinoksidin. It was noted that dioksidin has effective antimicrobial properties, that it has a positive influence on the course of the wound process, and that it is tolerated well by patients, especially when applied locally.

Majors of medical service R. F. Tagirov and Ye. M. Kargin reported on the treatment of patients with unexposed injuries of scrotal organs. The conservative wait-and-see tactic is unjustified for most such patients. Early surgical intervention is usually mandatory. Operations should be performed on persons with a traumatic hematocele and pooling of blood in cavities outside the testicular sheath or within the substance of the spermatic cord.

Colonel of Medical Service I. A. Ryabinin and his coauthors dwelled on the pressing problems of surgery on suppurative wounds. The large number of observations they cited demonstrated the high effectiveness of draining wounds with perforated silicone tubes, using fractional or constant irrigation. This technique improves the course of the wound process and reduces the time the patient needs to remain in the hospital.

There was much interest shown in a report by Candidate of Medical Sciences, Colonel of Medical Service V. I. Yegorov et al. on surgical treatment of complicated forms of acute appendicitis. The surgical tactics depended on the nature of the complication. When peritonitis of appendicular etiology was present, the abdominal cavity was drained with perforated silicone tubes, and peritoneal perfusion of antibacterial agents was performed for 2-3 days. Immunotherapy, parenteral nutrition, and direct blood transfusions were given an important place in integrated therapy. Surgery had to be repeated in 20.8 percent of the cases. There were no lethal outcomes.

A report by Doctor of Medical Sciences, Colonel of Medical Service Ye. A. Reshetnikov et al. analyzed complications following an appendectomy taking the form of wound infection, and the ways to prevent such complications. Having studied the results of surgery performed on 3,865 patients for acute appendicitis (at one of the hospitals of Moscow), they note that the main causes of complications are shortcomings in surgical technique and violation of aseptic conditions. The authors explained complications in patients who had undergone surgery for acute appendicitis by the body's lack of adaptation to a sudden encounter with infection. In their opinion the number of suppurative complications may be reduced by improving surgical technique and medical care in all stages. The level of the macroorganism's response to infection should also be studied and accounted for.

In their report "Emergency States in Vessel Surgery" lieutenant colonels of medical service V. B. Trofimov and V. N. Khodasevich demonstrated that in the presence of thromboembolisms and vessel injuries, the earliness of medical care and the degree of limb ischemia have great significance to the outcome of illness. Emergency angiographic analysis is mandatory with such patients, they believe. They also conclude that reconstructive surgery to correct obliterative atherosclerosis coupled with gangrenous alterations of the limbs is not any more dangerous than amputation, and that in most cases the limb is saved.

A report by Candidate of Medical Sciences, Colonel of Medical Service Yu. S. Kulikov provided a detailed discussion of debatable issues in the etiopathogenesis and treatment of a varicocele. Basing himself on phlebographic and phlebtonometric data and on a study of spermatograms and histological preparations of veins and testicles, the author suggests that the main danger with a varicocele lies in disturbance of the testicle's spermatogenic function and, in the end, infertility. The most effective treatment is resection of the testicular vein in the left iliac region (as described by Ivanisevich), which dependably prevents reverse flow of blood in the direction of the pampiniform plexus.

Questions associated with treating unexposed injuries to the knee joint coupled with injury to the ligament apparatus were discussed in a report by Candidate of Medical Sciences Lieutenant Colonel of Medical Service A. G. Mel'nikov and his coauthors. They used a lavsan belt to surgically correct the joint ligaments. A somewhat modified Mironova technique was used in order to secure the belt more firmly so as to restore the anterior crucial ligament. The immediate result was good with all 92 cases.

The same authors reported treatment of patients with compound (94.7 percent) and simple (5.3 percent) leg bone fractures. They turned attention to selection of the therapeutic technique, which must be strictly individualized, and determined on the basis of the nature of injury, the degree of displacement of fragments, and the overall condition of the victim. In addition they described the use of damped skeletal traction and compressional-distractional osteosynthesis with a Volkov-Oganesyan apparatus on 108 patients; all were returned to their units with no change in their fitness category.

Major of Medical Service A. D. Butakov and Captain of Medical Service A. I. Korovin dwelled on organization of surgical care in the medical service. In particular they noted that physicians of a medical battalion provide consultative and methodological assistance to troop physicians, analyze morbidity in the units, and develop measures to reduce it. Purposeful medical education work with the personnel, visits by specialists to the troops, treatment of ambulatory patients for demonstration purposes, and clinical conferences to which troop physicians are invited are helping to reduce morbidity and the incidence of injuries among servicemen.

Speaking in the debates, Professor, Major General of Medical Service V. G. Borisov emphasized that important questions of military field surgery were raised at the conference. The experience of treating gunshot wounds, unexposed abdominal injuries, and acute appendicitis deserves attention, and it may be utilized in the work of other therapeutic institutions. In his speech, Professor O. V. Oganesyan

stated his satisfaction with reports on traumatology and revealed the advantages of osteosynthesis with self-resorbing splints over metallic structures. In his opinion use of compressional-distractive osteosynthesis apparatus in field conditions is promising. Candidate of Medical Sciences, Lieutenant Colonel of Medical Service G. V. Grachev turned his attention to the fact that superselective venography and measurement of pressure in the renal vein of varicocele patients helps to establish the cause of hypertension within the vein and determine the most suitable therapeutic tactic.

In his concluding remarks the conference chairman, Professor, Major General of Medical Service M. V. Shelyakhovskiy, noted that the hospital's surgeons had made a great effort to study various aspects of military medicine, and to use the latest achievements of medical science in patient treatment. But at the same time he emphasized that some methods for treating gunshot wounds that may be promising in peacetime cannot be used in wartime, in relation to which the principle of subjecting wounds to meticulous open primary surgical treatment remains immutable.

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VARIATION OF HUMAN MEMORY UPON ADAPTATION TO CLIMATIC-GEOGRAPHIC CONDITIONS AFTER
TRANSMERIDIONAL FLIGHT

Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 6, No 6, Nov-Dec 80
(manuscript received 25 Jan 78) pp 970-977

IL'YUCHENOK, R. Yu., LEUTIN, V. P., VOL'F, N. V., TSVETOVSKIY, S. B. and
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[Abstract] Quantitative analysis of various types of memory was carried out with simultaneous investigation of the changes of some physiological functions that accompany reprocessing of information in man during adaptation. The experiments were carried out on eight test subjects ranging in age from 20-36 years under different climatic and geographic conditions of Novosibirsk and in the village of Yuzhno-Kuril'sk on Kunashir Island after a transmeridional flight. The changes in immediate reproduction of words and psychophysiological indicators of central nervous system activation were studied as a function of the period of adaptation. During the first days of adaptation there is a decrease in the stability of the physiological functions and memory indicators. The ability to recall words from the short-term memory is reduced. The stability of reproduction reached maximum variation on the third day in Yuzhno-Kuril'sk. The markedness of activation responses increased on the second day of adaptation, decreased on the third and fourth days and increased significantly on the 11th and 21st days of adaptation when psychological tests were administered. The ability to recall words improved as a function of the increase in activation of the central nervous system during later periods of adaptation. Figures 4; references 22: 18 Russian, 4 Western.
[183-6521]

FORMATION OF A NEUROPHYSIOLOGICAL CODE ELEMENT DURING PERCEPTION AND REPRODUCTION OF VERBAL SIGNALS

Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 6, No 6, Nov-Dec 80
(manuscript received 26 Mar 79) pp 1030-1038

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[Abstract] The formation of a neurophysiological code element in perception and reproduction of verbal signals was studied to see whether the encoded information is natural and vitally important to the brain or whether the given processes are the investigator's code. The acoustical characteristics of the perceived and reproduced verbal signals seem to be a reflection of the multicellular activity of the globus pallidus. The acoustic characteristics of the verbal signal are reflected through the operation of many neurons. The probability that the verbal signal will be used in speech activity is high. The process is intensified due to an increase of the neurons used in the process with respect to the effect of the long-term memory on multicellular activity of the globus pallidus. Figures 4; references 28: 23 Russian, 5 Western.
[183-6521]

INVESTIGATING THE PSYCHOPHYSIOLOGICAL MANIFESTATIONS OF THE EMOTIONS IN 18-20 YEAR-OLD PERSONS

Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 6, No 6, Nov-Dec 80
(manuscript received 12 Jul 78) pp 1067-1075

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[Abstract] Psychophysiological characteristics were studied in 18-20-year-olds by indicators of the intensity of the nervous system to predict emotional behavior. Highly emotional persons show considerably higher galvanic skin response to the same stimulus than do moderately emotional people. Healthy persons with increased emotional activity and high fear level are characterized by low indicators of nervous system intensity, intensified galvanic skin response to indifferent stimuli, a decrease in the amplitude of the t-wave in the EKG, hypersynchronous EEG and unique E-wave. Persons with a fear level were related to the hypersynchronous type of emotionality in EEG investigations, while emotionally stable persons did not

display this type of EEG. The hypersynchronized activity may be related to increased emotionality and its presence in the background indicates the disposition of these persons to hyperemotional responses. Figures 3; references 28: 18 Russian, 10 Western.
[183-6521]

UDC 612.766.1

TIME STANDARD SYSTEMS FOR WORKING MOTIONS AND THEIR USE TO ANALYZE WORK RATE

Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 6, No 6, Nov-Dec 80
(manuscript received 23 Nov 79) pp 1085-1093

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[Abstract] The psychophysiological evaluation of systems of time standards on the working motions was carried out. The work time occurring at a specific rate was calculated on the basis of time standards developed for the basic human motions and classified according to their nature and conditions. Application of systems of time standards to working motions reflect the characteristics of integral units of activity. Systems of time standards for working motions can be used to measure the rate of work activity if the work cycle is long enough and if it contains a large number of different microelements. The time standards of the Work Factors system are calculated for an average of 50 percent use of the work rate. This corresponds to the upper boundary of the optimum rates. The average rates during the working day comprises 30 to 40 percent of the working range during occupational activity. Figures 3; references 74: 36 Russian, 38 Western.
[183-6521]

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